PRACTICAL MANUAL OF

DISEASES OF WOMEN

UTERINE THERAPEUTICS

PRACTICAL MANUAL

OF

DISEASES OF WOMEN

AND

UTERINE THERAPEUTICS

FOR STUDENTS AND PRACTITIONERS

BY

H. MACNAUGHTON-JONES, M.D., M.CH.

MASTER OF OBSTETRICS (HONORIS CAUSA), ROYAL UNIVERSITY OF IRELAND;
FELLOW OF THE ROYAL COLLEGES OF SURGEONS OF IRELAND AND EDINBURGH;
PRESIDENT OF THE BRITISH GYNÆCOLOGICAL SOCIETY;
IFERY A
AND EXAMINER IN MIDWIFERY AND DISEASES OF WOMEN AND CHILDREN
IN THE ROYAL UNIVERSITY OF IRELAND.

EIGHTH EDITION, REVISED AND ENLARGED

WITH 640 ILLUSTRATIONS AND 28 PLATES



LONDON:

BAILLIÈRE, TINDALL AND COX

20 & 21, KING WILLIAM STREET, STRAND

[PARIS AND MADRID]

1900

To

THE MEDICAL GRADUATES

OF THAT UNIVERSITY WITH WHICH HE WAS,
FOR A PERIOD OF TWENTY-TWO YEARS, CONNECTED, EITHER AS
STUDENT OR TEACHER,

THIS BOOK IS INSCRIBED

IN RECOLLECTION OF THE HAPPIEST PERIOD OF HIS LIFE

BY

THE AUTHOR.

PREFACE TO THE EIGHTH EDITION.

Though it cannot be said that within the past few years any very striking advances have been made in gynæcology, it is true that during the period since the last edition of this work appeared there has been considerable progress made towards the satisfactory settlement of many vexed questions, pathological, clinical, and operative. It is, however, particularly in the last direction that gynæcologists may congratulate themselves on having more definitely indicated the operative procedures to be followed in those graver instances of disease in the generative organs. The technique also of a number of operations has been vastly improved, and gradually an agreement is being arrived at as to the best route, abdominal or vaginal, for attacking tumours or morbid conditions of the uterus and adnexa.

Advance has likewise been made in the diagnosis and treatment of affections of the urinary organs, and the means of investigating the latter, as well as in the improved facilities for operating, through new methods and appliances. In the field of pathology we have a more accurate differentiation of the various types of growths and degenerative changes, whether in the uterus, tubes, or ovaries, and have gained a clearer insight into many etiological points of practical interest connected with their causation and development. The researches in the field of ectopic gestation have been many and valuable. In short, gynæcology is being established on the only sure basis on which any branch of medical science can be founded, and that is, the dependence of its clinical principles and axioms on exact histological and pathological research.

It has been necessary, in consequence of this progress, to

again completely re-arrange, in great part re-write, and considerably modify former editions of this work, and so it appears in a completely new form. Obsolete views, practices, and appliances have been omitted, and I have endeavoured to make it, for both student and practitioner, a condensed compendium of gynæcology, including everything of practical importance which has appeared up to the date of its publication. The names of the authorities quoted throughout its pages will serve to show its cosmopolitan character.

Here I must specially express my indebtedness to a number of authorities whose writings I have used for reference, and whose names are, in every instance, associated with the teachings referred to, or any excerpts I have made use of.

I have had the advantage of personally visiting in successive years the clinics of Professors Martin, Landau, and Olshausen in Berlin, of Schauta in Vienna, and seeing for myself the thorough aseptic methods in these as well as those of Terrier and Hartmann in Paris, as also of Doyen, and the experiences gained by these visits have been generally included.

To Professor Landau and Professor Jacobs I am indebted for clichés, and also to Dr. Jayle, and for many valuable hints to Professor Pozzi. Dr. Doyen has been especially kind in sending me a number of clichés, which appear in the chapters on the operative treatment of fibromyomata and cancer of the uterus, and I have also to thank him for the plates of original photographs which he has been kind enough to give.

I cannot sufficiently express the obligation I am under to Dr. Howard Kelly's original work in the Johns Hopkins Hospital, most of which has appeared in his unrivalled treatise on 'Operative Gynæcology,' and of which I have largely taken advantage throughout these pages.

That most comprehensive summary of contemporary gynæcological work that appears in the *Gynæcological Journal*, under the able editorship of J. J. Macan, has furnished me with much valuable information, and the excerpts, translations, and reports of proceedings of foreign societies contained therein have been most useful to me. More especially to Dr. Furneaux Jordan, Dr. F. Edge, Mr. John Taylor, and Dr. Hebert, whose annotations I have utilized, I must tender my thanks. Dr. Mary

Dixon Jones, whose original pathological work in diseased states of the ovaries is well known, has obliged me with several illustrations and notes. In the re-arrangement of the chapters on the Fallopian Tubes and Ovarian Cystoma I have availed myself of Dr. Arthur Giles' assistance when writing those portions devoted to the pathology of the ovaries and ectopic gestation.

For several illustrations in the latter I have to thank Mr. Bland-Sutton, Mr. John Taylor, and Dr. J. Cullingworth. To Mr. Alban Doran, Mr. Hubert Roberts, Dr. Shaw-Mackenzie, and Dr. Haultain I am also indebted for various drawings in these same chapters and that on Deciduoma Malignum.

Without the co-operation of Mr. J. H. Targett I could not have included a large number of the plates and microscopical drawings, inasmuch as all those taken from my own specimens have been prepared or mounted by him.

Messrs. Arnold and Son have generously provided me with engravings, executed especially for this work, the drawings being taken from the most recent models of instruments in my possession, in use in Continental, American, and British clinics.

Finally, I do not think that, with all the other work on my hands, I should have succeeded in getting this edition through the Press, were it not for the labour from which I have been relieved by my secretary, Miss Gask, in the reading of proofs, the compilation of the index and references, and several other matters of detail.

My publishers have spared neither trouble nor expense in meeting my wishes in every respect in the production of the book.

H. MACNAUGHTON-JONES.

131, Harley Street,
February 1, 1900.

N T



CHAPTER X.

CHAPTER XI.

CHAPTER XII.

CHAPTER XIII.

CHAPTER XIV.

CHAPTER XV.

CHAPTER XVI.

CHAPTER XVII.

CHAPTER XVIII.

CHAPTER XIX.

CHAPTER XX.

CHAPTER XXI.

CHAPTER XXII.

CHAPTER XXIII.

CHAPTER XXIV.

CHAPTER XXV.

CHAPTER XXVI.

CHAPTER XXVII.

CHAPTER XXVIII.

CHAPTER XXIX.

CHAPTER XXX.

CHAPTER XXXI

CHAPTER XXXII.

CHAPTER XXXIII.

CHAPTER XXXIV.

CHAPTER XXXV.

CHAPTER XXXVI.

CHAPTER XXXVII.

CHAPTER XXXVIII.

CHAPTER XXXIX.

CHAPTER XL.

CHAPTER XLI.

CHAPTER XLII.

CHAPTER XLIII.

CHAPTER XLIV.

CHAPTER XLV.

CHAPTER XLVI.

CHAPTER XLVII.

CHAPTER XLVIII.

ERRATA.

Fig. 283, page 356, *read* '30 grs. ad ℥i.'

„ 354, „ 452, *for* 'Schauta's' *read* 'Ehrenfest's.'

„ 357, „ 454, *for* 'Reversing' *read* 'Reverdin's.'

LIST OF ILLUSTRATIONS.

* This is described in the text as Shauta's. I find from Dr. Ehrenfest (Dr. Shauta's assistant) that he it was who designed and described the instrument.

LIST OF PLATES.

DISEASES OF WOMEN.

CHAPTER I.

ANATOMICAL AND CLINICAL.

SUMMARY OF ANATOMICAL FACTS WHICH HAVE A BEARING ON GYNÆCOLOGICAL PRACTICE.

It is outside the scope of this work to enter into a detailed description of the female pelvic organs and their relations. There are some simple anatomical points connected with the female organs of generation that must, however, be remembered by every student and practitioner, and which have an important clinical bearing on the examination and conduct of a gynæcological case. It is necessary, in the first place, very briefly to allude to these.

Vulva (Fig. 1).—The vulvar orifice is elliptical in shape, and comprises the mons veneris, labia majora, labia minora, clitoris, meatus urinarius, vestibule, fossa navicularis, fourchette and hymen. It varies in size in different individuals. In some women the vulvar opening is contracted. Both its size and elliptical shape influence us in the choice and method of introducing a speculum in the virgin, and in sensitive women. The best tubular specula are those of a tapering form, or such as expand with two or three blades. Occasionally there is complete atresia of the vaginal orifice. The sebaceous follicles on the inner surfaces of the labia, with the adjacent mucous membrane, offer to all contagious secretions a large surface for the retention of fluids, septic particles, or any specific virus. On the vulva or vulvar orifice we occasionally find, in unhealthy states of the system, aphthous and gangrenous sores, specific ulcers, purulent discharges; in children, noma vulvæ. Its exposed position renders it specially liable to injury, either from

accident or violent intercourse. The apposition of its mucous surfaces, and the irritation produced by friction during exercise, or in inflammatory states of the vagina, when we have unhealthy discharges, cause a sense of heat, and other symptoms of vulvitis. During the exanthemata, in puerperal and other fevers, such as smallpox, measles, and scarlatina, the vulva is occasionally inflamed. The predisposition of the follicles and mucous membrane to inflam-

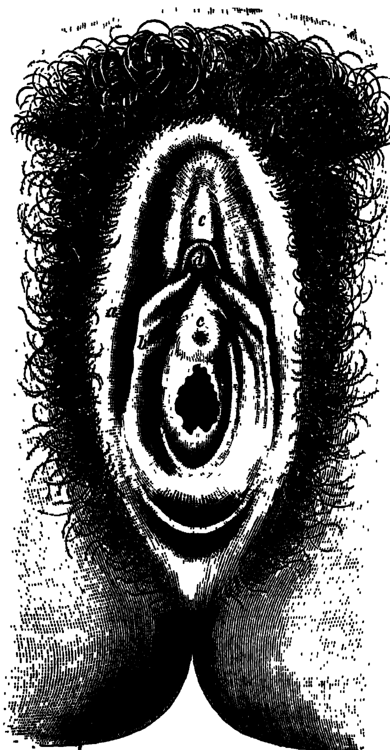


Fig. 1.—The Vulva.*: *a*, Labia majora; *b*, Labia minora; *c*, Meatus urinarius; *d*, Glans clitoris; *e*, Clitoris; *f*, Mons veneris. (Sharpey.)

mation, their occasional exposure to irritating secretions, the effects of uncleanliness and injuries, and the abundance of cellular tissue found under the mucous membrane, afford a ready explanation of the frequency with which phlegmonous inflammation attacks the

* Contrast this drawing of the normal virgin outlet with that of the relaxed vaginal outlet in the chapter on Ruptured Perinæum.

vulva. This bulbous vestibuli with its erectile tissue corresponds with the bulb of the male urethra. Beneath the labia is the vascular bulbous hirudiniform body, the bulb of Kobelt, which is composed of a large plexus of veins. In front of the bulb is another smaller plexus at each side, the *pars intermedia* of Kobelt, corresponding to the part of the male corpus spongiosium urethræ between the bulb and the glans. In this anatomical arrangement we have an explanation of pudendal hæmorrhage and thrombus. I have seen fatal hæmorrhage follow from malignant ulceration of one labium, notwithstanding that every means of treatment was employed. The large vascular supply of the vulva explains, also, the occurrence of septic poisoning and septicæmia, which result from injuries and abscess of the vulva, or from the breaking down of a thrombus and the exposure of coagula. It is thus evident that cleanliness is the first essential of treatment in any case of vulvar inflammation. Careful antisepsis is indicated when any incisions are made in vulvitis. The vulvo-vaginal gland occasionally has its duct occluded, and over-distension of the duct may follow, with arrest of secretion and inflammation of the lining membrane spreading to the gland, abscess in the gland, or hyper-distension of the gland and the formation of a cyst. The presence of a defined tumour at either side of the vulva, varying in size from a large nut to a pigeon's egg, painful and fluctuating, is fairly characteristic. The analogy of the labia to the male scrotum is obvious. As the loop of intestine descends with the spermatic cord in the male into the scrotum, so it passes with the round ligament to the labium in the female. Care must be taken not to mistake a painful hernia of the labium for an abscess. Unless there be strangulation, the hernia returns with the horizontal posture and pressure. The obliteration of the canal of Nuck explains the comparative rarity of inguinal hernia in the female. A hydrocele of the round ligament may occur, and it is necessary to bear this contingency in mind.

Such a case I had under my care; the lady came for 'removal of the tumour.' I expressed the opinion that it was a hernia. Another surgeon subsequently pronounced it to be an encysted hydrocele of the left round ligament. I was, in the course of time, suddenly called to see this patient. The bowel had ruptured. I made an artificial opening, and she recovered. Another swelling afterwards came in the right side. This proved to be a piece of strangulated gut. She was again operated upon, and was getting on well, when a gross imprudence in diet induced peritonitis, of which she died.

THE CLITORIS, the homologue of the penis, is situated at the

commencement of the vestibule, half an inch behind the anterior angle formed by the labia. It may be hypertrophied, or the seat of a growth, such as sarcoma or carcinoma, or of cystic disease. It can be avoided in digital examinations by keeping to the rectal wall of the vagina, and when passing the catheter, by arriving at the meatus through the guide afforded in the cord-like feel of the urethra. Masturbation leads to many forms of nervous mischief in women. The operation of clitoridectomy for various disorders of the nervous system, more especially epilepsy and hystero-epilepsy, brought on by masturbation, is not an accepted operation in this country. Rather must we combat the habit by judicious moral means, healthier mental and physical occupations and enjoyments. Even if we do not lead the patient to believe that we suspect the vice, we must, by the directions we give in her hearing, or to her, let her feel that any undue excitement of the external organs of generation is most pernicious, and likely to be followed by disastrous results. Next to masturbation, too frequent medical examinations are to be condemned, especially among that type of woman whom we can easily see is of the neurotic temperament, and can ill conceal her neurotic feelings.

THE URETHRA.—The shortness of the female urethra saves the woman the penalty paid for every additional inch in length of the male canal. Its dilatability admits of digital exploration of the bladder, after sufficient dilatation with an ordinary urethral dilator, a small glove-stretcher, or any uterine dilator. In dilating the urethra, as pointed out by Simon, a dilatation of 2 centimetres is sufficient to enable us to introduce the index-finger into the bladder. I always prepare the way for the finger by the previous passage of my graduated dilators.

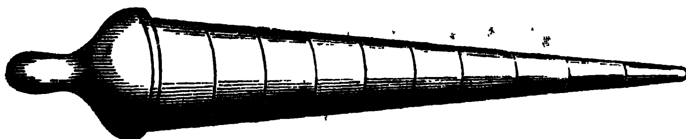


FIG. 2.—KELLY'S URETHRAL CALIBRATOR (the lines indicate the diameter in millimetres).

Howard Kelly uses a urethal calibrator for exploring the bladder in his new method of endoscopy and for catheterization of the ureters.

He says: 'In order to determine the proper dilator to begin with, I calibrate the meatus urinarius externus by means of a slender metal cone 10 centimetres

long, marked in a graduated scale from the point (2 mm.) to its other end (20 mm.) in diameter. The calibrator is pushed into the urethra as far as it will readily go, and the marking of the meatus is noted.' This indicates the calibre of the dilator to be first introduced. 'The average female urethra,' he says, 'can be easily dilated up to 12 mm. in diameter, with only a slight external rupture. I have never seen a tear more than 2 or 3 mm. in length, and from 1 to 1½ mm. in depth.'

In introducing the finger, it must be borne in mind that the safety with which it is used depends upon the size of the digit of the operator, and also on the care and gentleness with which it is inserted. I have never had any permanent bad results from such combined instrumental and digital exploration of the bladder. The *circumference* of the terminal joint of my forefinger is 5 centimetres, that of the first 7 centimetres. Laminaria or tupelo dilatation is a thing of the past. Dilatation renders litholapaxy (Bigelow's operation), or lithotrity, comparatively an easy operation in the woman. We need never experience any difficulty in relieving the female bladder. Any short tube over 3 inches long, which has been disinfected, will successfully accomplish the necessary operation, if we happen to forget our catheter. Any little warty growth above the nymphæ or urethra should demand our attention, also any discharge pouring from its orifice. In ordinary vaginitis the orifice of the urethra has not generally an inflamed, pouting appearance. It frequently has in gonorrhœal inflammation. Caruncle, warts, tumours, and hypertrophied states of the nymphæ occasionally occlude the orifice of the urethra.

THE VAGINA.—This canal measures from 2½ to 3 inches along its anterior wall, and 3½ to 4 inches posteriorly, varying in length in different women, and in the virgin and multipara. It is narrower below and above, and is very distensible in women who have borne children, widening at its uterine extremity. It is enclosed at the sides by the levatores muscles. Its dilatability explains, especially in atonic states of the vagina, the large accumulation of gas or fluid that collects in the canal. The lower end is surrounded by the striated muscular fibres known as the sphincter vaginæ. An illustration of these facts is afforded by the forcible and audible expulsion of air which occurs occasionally after a woman has been in the genu-pectoral position. The muscularity and elasticity of its walls are shown by the inherent power that the vagina possesses of expelling its contents; as, for example, expulsion of the after-birth, the speculum, or physometrous collections.

It is necessary to remember the columns and rugæ which project from the vaginal walls, and which give cover to leucorrhœal and other discharges. We speak familiarly of the *anterior vaginal* and posterior vaginal fornix—important recesses, or *cul de sacs*, in front and behind the uterine neck, which have to be carefully explored in digital examinations. The vagina is materially influenced by the acts of respiration, being depressed during inspiration, rising again

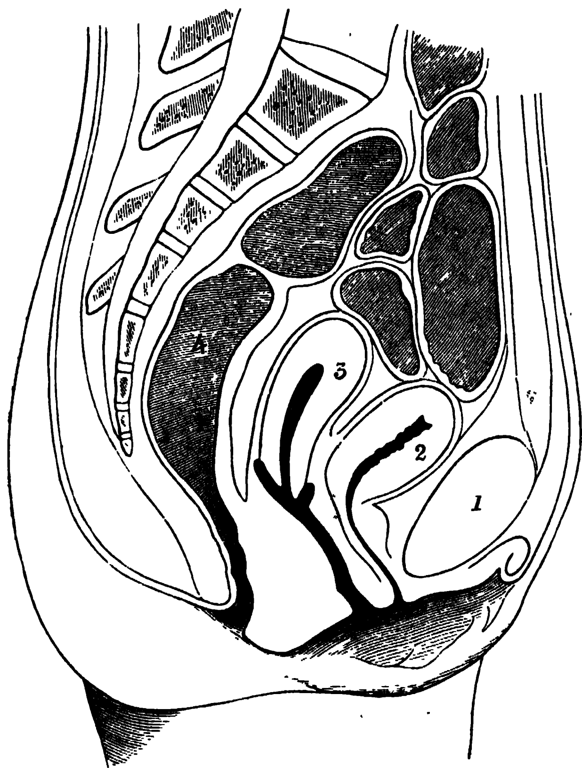


FIG. 3.—SECTION OF THE BODY OF A WOMAN, AGED TWENTY-FIVE, SHOWING THE PELVIC VISCERA AND PERINÆUM. (From 'Atlas of Descriptive Anatomy.' After Heitzman.)

during expiration. The position of the bladder, the distension of the rectum, the state of the superincumbent viscera, and pressure on the abdominal wall, all affect the vagina. The dense bed of cellular tissue which unites it to the base of the bladder, and, still lower down, and more intimately, to the urethra, affords a clue to the associated movement of the bladder, uterus, and vagina. Its

connection posteriorly to the rectum, through the peritoneum above and loose cellular tissue inferiorly, explains a similar association of movement with this viscus, though in a less degree. We have thus an elastic muscular tube, influenced on all sides by the surrounding viscera. It has connected with it an organ whose weight and position periodically vary, subjected to much the same influences from its surroundings as the vagina itself, and by which canal it is in great measure supported. The only sound gynæcological view to take of the vagina is to regard it as the important link of union between the uterus, rectum, and bladder, while with the perinæal body it supports the uterus inferiorly. Its muscularity further

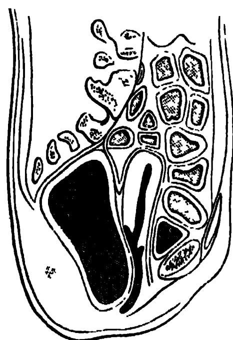


Fig. 4.—From Braune, showing Distended Rectum and Empty Bladder (Piragoff's Section).

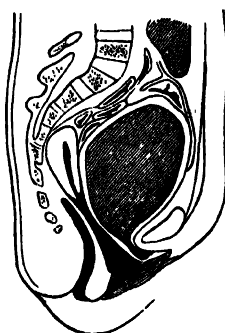


Fig. 5.—From Braune, showing Distended Bladder (Piragoff's Section).

endows it with this supporting power. The terms 'canal' and 'tube' are apt to give the student an erroneous impression. In old multipara, in cases of procidentia, and uterine displacements, or when there are abnormal states of the bladder or rectum, the vaginal walls at the fundus may be separated. We have, however, only to watch the passage closing after an ordinary examination, or to feel for ourselves—by the introduction of the finger—the close apposition of the vaginal walls, to be convinced that the normal condition of the vagina is one of complete closure. Two most important purposes are thus effected. Greater support is obtained for the uterus above; the entrance of putrefactive elements is prevented from below. In atonic states, when the muscularity of the vaginal walls is lost, we lose much of this advantage; the uterus sinks, and if, as unfortunately is often the case, the perinæal body has also suffered, and is deficient in tone and vitality, or if it have

been injured by parturition, the uterus becomes still more displaced, dragging with it the anterior vaginal wall, which in its turn descends, and we have the first stage of the subsequent procidentia or prolapse. Frequently, with so-called 'supports' or pessaries, this baneful result is encouraged, and that vaginal uterine support is weakened. *I speak of their misuse,* not of their scientific and accurate application. Perhaps no gynæcological appliance is still more commonly abused than a pessary. To fix a rigid and *immovable* bar or ring in the normal vaginal passage is essentially barbarous and unscientific. Yet this is commonly done from ignorance of the first principle of a uterine support, until we occasionally have to cut it out of the vaginal wall, in which it has formed for itself a bed.

Some years since, I removed with much difficulty a huge vulcanite ring pessary from the vagina of a patient who had worn it without removal for five years, and more recently a rubber Hodge which had remained in the vagina over eight years. The latter was encrusted with hardened mucus and calcareous particles. The entire vaginal cervix was deeply eroded.

The vast extent of the mucous membrane of the vagina explains the difficulty we experience in curing vaginitis, and the severity of gonorrhœal inflammation in the female. Its folds and rugæ afford hiding-places for secretion and impure discharges. Its numerous vascular papillæ (with their investing epithelium removed), at first congested and prominent, finally become hypertrophied, and granular vaginitis results.

THE HYMEN.—I have seen one case where the hymen was rigid and unruptured, only a very small aperture existing, and still the patient became pregnant. This only establishes the well-known fact that penetration is not necessary for the act of conception to take place. Often this thickened hymen causes trouble after marriage and demands interference. In most cases the passage of an expanding speculum or the solid glass dilator, the patient being under an anæsthetic, will quickly rectify this defect. After such forcible rupture and dilatation the dilator is passed daily, or is used as a vaginal rest and kept with a T bandage in the vagina for a few hours at a time. Frequently in such cases there is an irritable condition of the vaginal orifice, and some slight vaginitis present. The more serious condition, 'imperforate hymen,' is dealt with in the chapter on 'Atresia of the Vagina.'

When a young girl after the age of puberty, who has never menstruated, is brought to us complaining of ill-defined abdominal pains, and, it may be, some

attendant constitutional symptoms, we should always satisfy ourselves that there is no atresia of the vaginal passage nor any occlusion of the vulva. Now and then we meet a case in which rigors have occurred, and there is high temperature, with rapid pulse, severe abdominal pain, local tenderness, and distension, or the physical signs of a tumour present. Here, with an imperforate hymen, we may suspect peritonitis, retro-hæmatocele, and the greater danger of septicæmia.

At the British Gynæcological Society, I brought forward the question of the condition of the hymen as evidence of virginity or chastity. The following variations in the nature and shape of the hymen have been described by Alexander Skene, of New York; *hymen cribriformis*, hymen with a number of small openings; *hymen annularis*, hymen with one small central opening; *hymen fimbriatus*, fringed like the Fallopian tube. To those three I would add the variety I then described as *folding hymen.*

Kinkead,* of Queen's College, Galway, has instanced cases in which frequent coition had taken place, and others in which labour at full term was completed, without injury to the hymen. Lombe Atthill alluded to this yielding of the hymen, during intercourse, of a rubber-like membrane, without the least cracking. In some most serious cases that have been brought to me for an opinion as to the alleged impotence of a husband or the chastity of a woman, and in which the gravest issues were involved, I found this '*folding*' form of hymen. The hymen was quite perfect and uninjured, yet a fair-sized speculum, or a vaginal dilator, could be passed into the vagina. The membrane simply folded back against the vaginal wall, returning again to its normal position on the withdrawal of the instrument. It must be remembered that the carunculæ are formed by child-bearing only, and not by simple laceration. The importance of remembering that this yielding form of hymen may exist is obvious. It may have a critical bearing on medical evidence in a case of supposed rape.

The following examples instanced by me in the paper I have referred to, show the need for recognition of this condition of hymen:—

I.—A patient was brought for examination who had been recently married. A coolness had arisen immediately after marriage, owing to some difficulty having occurred in intercourse, which she ascribed to ineffectual efforts on the part of her husband. But, contra, he alleged that she had resisted, and feigned

* Paper read before the Royal Academy of Medicine in Ireland on the 'Proofs of Virginity,' by R. Kinkead, December 29, 1887.

such great pain at the time that he had to desist. This coolness was accentuated by a suspicion of previous impurity on the part of the woman. Upon examination, the hymen was found complete, but of the folding type. An opinion had previously been given that the woman was intact. Subsequently, disclosures proved that she had lived irregularly, and had aborted previous to her marriage.

II.—A patient wished to establish a charge of impotence against her husband. She had already been examined with this object, and pronounced intact. It was ascertained that there had been only a few occasions on which sexual intercourse could have occurred within a given number of months. She strongly resisted internal examination, lest the hymeneal proof of her virginity should be destroyed. Looking at the hymen, it was found to be uninjured and normal in appearance. Casually, during examination, a slight suprapubic enlargement was discovered. This aroused suspicion, which the appearance of the mammæ confirmed. A vaginal examination was carefully made, and a perfectly yielding hymen was found of the nature described. Though told that she was pregnant, the patient persisted in the denial of cohabitation having taken place, even to the point of endeavouring to produce medical evidence of her chastity in a case for nullity of marriage. She was, however, confined of a child at full time some six months subsequently.

III.—A most serious charge was preferred, which was in part rebutted by exculpatory evidence on oath, that a man had had intercourse with a young girl, extending over a considerable period of time. The case was one in which the gravest issues were at stake.

The girl's cause was subsequently taken up by powerful friends, and she was submitted to medical examination. The hymen was found complete, and upon this fact medical opinions were elicited that it would have been impossible, or at least improbable, that sexual intercourse could have been continued over such a length of time as that stated. She was brought for an expert judgment on this point.

The hymen was found as already described, but on a digital examination being made, it completely yielded and folded back.

Ultimately, without any force or difficulty, a fair-sized conical speculum was passed, and also a comparatively large glass vaginal dilator, without the least injury. The opinion was given that frequent coition, partial or complete, was quite feasible under the conditions, but that *the chastity of the girl was not impugned.*

Nevertheless, legal pressure, only stopping at the point of dragging an unwilling and hostile medical witness into court, was unsuccessfully exercised to force an opinion that it was not possible under these conditions that repeated copulation could have happened.

These three examples are sufficient for my purpose. In them we have the following issues involved:—

In Case 1.—The impotence of the husband, and the ante-marital chastity of the wife, as bearing on the question of nullity of marriage or separation.

In Case 2.—The impotence of the husband, and the problematical doubt raised as to the parentage of the child.

In Case 3.—The perjury of the man and the chastity of the woman.

PERINÆUM.—Sufficient has already been said of this body as a support, to indicate the necessity of attending to any old lacerations or rents. Defect of the perinæal body is one of the most frequent causes of uterine displacement. We also learn this important lesson, to always inspect the perinæum after labour, especially after first labour. Many a small rent, the source of future uterine trouble, escapes notice even after ordinary labour. Let us always regard Goodell's two invaluable hints—'*relaxation* of the perinæum' and 'immediate suture.' * The harmful old practice of 'supporting' it and the negligence of postponing the closure of the rent, have cost many a woman an infinity of misery, and, through a septicæmia, induced by perinæal wounds made in operating and during the puerperal period, have caused, occasionally, peritonitis and death.



FIG. 6.—POSITION OF THE BODY IN THE GENU-PECTORAL POSITION. The thighs should be separated more than is shown in the drawing.

The influence of decubitus on the vagina is of importance. In the dorsal position the vagina remains closed; hence after many operations we prefer to keep the woman in this position for a certain time. I am still of opinion that, consistently with the obvious relief that occasionally allowing her to turn on her side affords, the dorsal decubitus is the safest post-operative position.

* To 'relax the perinæum' in labour, we pass the fore and middle fingers of the left hand into the rectum, and hook forward the sphincter, while the thumb of the same hand retards and modifies the pressure of the advancing head.

In washing out the vagina with the patient in bed, the lateral or semi-prone is preferable. In examination we elevate the hips while the patient is in this position, so as to open the vagina, thus relieving it of the superincumbent weight of the abdominal viscera. But we take advantage most effectively of gravity in the knee-elbow, or genu-pectoral, position: the woman converts her elbows, chest, and knees into a form of tripod (Fig. 6). The hips



FIG. 7.—VIEW OF THE VISCERA IN THE INLET OF PELVIS FROM ABOVE. (From Howard Kelly.)

and buttocks are thus raised, the viscera are thrown downwards and forwards, the ovaries—as Goodell naïvely expresses it—'are put to bed.' It is the position we avail ourselves of in many vaginal operations, especially vesical, rectal, and uterine fistulæ. It is also that to be selected in certain cases of retroversion during replacement of the organ, and should be adopted periodically by the patient

after this has been effected. In it the vaginal walls separate, and most readily open when the examining finger is inserted. There is also the mechanical pressure exercised on the uterus and vaginal walls by the imprisoned air which accumulates in the vagina during manipulation in this position.

The Pouch of Douglas.—This important space, formed by the utero-rectal folds of peritoneum, is the receptacle occasionally of an intestinal loop, a prolapsed ovary, cystic tumours, ovarian tumours, effusion of lymph, pus, and blood. Encroaching on it we may find a retroverted uterus, and pressing upwards into it, in extreme cases of anteversion, the cervix uteri. Obstructing it posteriorly, we meet with, from the rectal side, fæcal accumulation, malignant growths of the rectum, and sacral tumours. In ordinary conditions the rectal and uterine walls of Douglas' space are in apposition; they are separated by tumours, effusions, and anteverted and anteflexed states of the uterus. To examine this space, which is always essential in any suspicious case of uterine enlargement or rectal inconvenience, an enema should first be administered, and the rectum carefully, gently, but thoroughly, explored with the finger. I have only to remark on the necessity for gentleness in all such rectal manipulations.

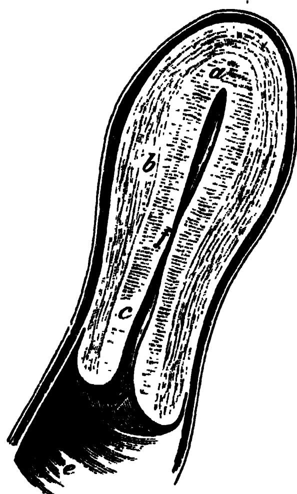


Fig. 8.—Vertical Section of Uterus (Ramsbotham).

Elsewhere the anatomical peculiarities of the rectum in children and the clinical bearing of these are discussed.*

It is better first to partly introduce the forefinger of the left hand, well anointed with lard, slowly stretch the external sphincter to either side, and then gradually insert the entire finger and explore the rectum; we may detect internal hæmorrhoids, fissure, ulcer, or stricture; a collection of fluid in Douglas' pouch, uterine retroversion, enlargement, or prolapse of an ovary. In retro-hæmatocele, and pelvic effusions, such an exploration is essential to define posteriorly their nature—if hard and resisting, or soft and yielding. Thus also

* See chapter on Steps of Examination.

we may often best ascertain the sensitiveness, or degree of congestion, of the ovary.

The therapeutical dilatation of the rectum under an anæsthetic for an excessive reflux irritability of the sphincter, with dryness of the mucous membrane, brought on occasionally by erotic practices, I deal with in the chapter on the Rectum.

THE UTERUS.—It is right that we should always have before our mind what are the dimensions, size, and weight of the healthy uterus in the young virgin, and in the adult and multiparous woman. I take those of Richet and Sappey :—

UTERUS.

	Measurement in inches.		
	Virgin.	Nulliparæ.	Multiparæ.
Entire Uterus, longitudinal	2·20	2·52	2·72
„ thickness	0·85	0·90	1·00
„ transverse	1·22	1·80	1·90
Cavity of Uterus, transverse	0·60	1·08	1·24
„ length	1·80	2·20	2·44
Isthmus uteri, length	0·20-0·25		0·16
„ width	0·16		
„ antero-posterior	0·12		
	Grains.		Grains.
Weight	360 to 1000		1200 to 1800
Capacity		2·2 c. cm.	3·5 c. cm.

The uterus in the normal condition should not be felt above the pubes. It may be felt over the pubes about the third month of pregnancy, and two fingers' breadth above it at the fourth. In the natural state it lies anteverted in the pelvis. It is included between two lines, one drawn from the sacrovertebral angle to the lower border of the pubic bone, and the other carried from the inferior margin of the fourth piece of the sacrum to the lower border of the symphysis. The axis of the uterus obviously varies with the condition of either the bladder or rectum. This is well seen if we note the position of the uterus as represented by Kohlrausch, and compare it with the diagrammatic drawing of Schultze. In the former the bladder is distended, while the latter represents the normal position of the virgin uterus. It is clinically well to remember how freely movable the healthy uterus is, *slung*, as we may say, in the pelvis, by its various ligaments. This mobility is influenced by the

size of the uterus, by the condition of the surrounding cellular tissue, and the state of the pelvic ligaments—*fixation of the uterus* being a most important guide in the diagnosis and prognosis of

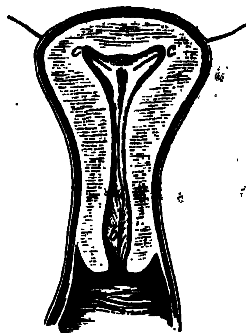


FIG. 9.—LATERAL SECTION OF UTERUS. (Ramsbotham.)

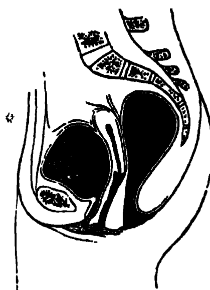


FIG. 10.—FROM BRAUNE, SHOWING UTERUS PRESSED UPON BY DISTENDED BLADDER AND RECTUM. (Legendie.)

various uterine affections. It is frequently fixed in fibroid enlargement, in malignant disease, by pelvic peritoneal effusions, and in



FIG. 11.—NORMAL POSITION OF VIRGIN UTERUS. (Schultze.)

cases of retroversion where adhesions exist. We are enabled, from its normal dimensions, to comparatively estimate its increase in size in morbid states, notably in fibroid enlargement and subinvolution.

The dimensions of the isthmus explain to us the difficulty occasionally met with in passing the uterine sound, and, still further, how essential free dilatation of the sphincter uteri is in any form of intra-uterine medication. They also explain how readily the narrow canal may be closed by reflex contraction, by irritation, or inflammation, and how imprisonment of secretions or medicated solutions occurs in the uterine cavity. Just as important is the situation of the isthmus uteri with regard to the reflected utero-rectal and utero-vesicle folds of the peritoneum. Above and below the isthmus uteri the organ is free, being supported just at this part by the bed of cellular tissue which surrounds it. The uterus is thus balanced in the pelvis by the reflection of peritoneum

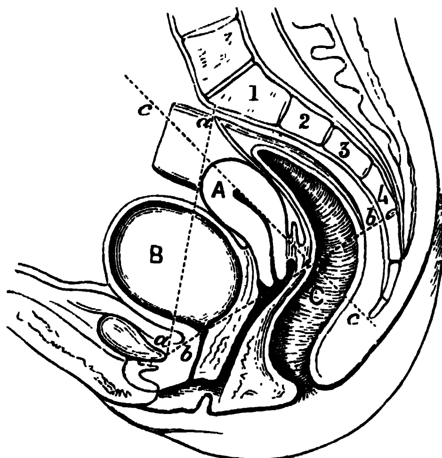


FIG. 12.—RELATIVE POSITION OF PELVIC VISCERA WHEN THE UTERUS IS PUSHED BACK BY A DISTENDED BLADDER. (A. Farre.)

and encircling cellular tissue. The uterus has the tendency to bend backwards and forwards at this situation—a bending still further increased by the consequent constriction of the bloodvessels, at the junction of the cervix with the body, and an increase of weight, posteriorly or anteriorly, from congestion of the tissues or small myomata, in the posterior or anterior wall of the fundus above the seat of constriction. Constriction leads to congestion, congestion to hyperplastic effusion, and both to excessive tissue-formation, which ultimately tends to contraction, and resulting flexion. Flexion produces narrowing or twisting of the uterine canal at this spot, and stenosis, with all its consecutive ills.

Thus we get an insight into the natural sequence of changes which tend to produce congestion of the fundus uteri, stenosis of the cervix, hyperplastic effusion, versions, flexions, fibroid developments, hardness of the cervix, amenorrhœa, dysmenorrhœa, and sterility. This freedom of movement teaches us also how important it is *not to overlook the uterus as a source of vesical irritation, retention, or incontinence of urine.*

Cure of Chronic Incontinence of Urine by Rectification of Displacement.

A lady consulted me who for twelve years had had incontinence of urine, until, ultimately, she was shut out from the enjoyment of society, and had always to wear a diaper or urinal. Her life was miserable, from the constant passing and dribbling of the urine. She had been under a variety of treatment. I gradually straightened the ante-flexed uterus by the use of the sound and stem pessaries. The bowel was carefully attended to, and the general health restored by suitable tonics. She recovered perfect health and comfort, nor was there at any time the least tendency to unusual irritation of the bladder. I should now treat such a case by ventro-fixation.

*Cure of Incontinence of Urine by Ventro-fixation.**

A lady, aged forty-eight, consulted me in February, 1898, for incontinence of urine, she having for some time been obliged to wear a urinal. During my examination the urine was flowing from the bladder. There was a large ante-flexed uterus, the fundus of which lay directly forward on the neck of the bladder. There was also anterior vaginal prolapse. I operated on March 3rd by ventro-fixation. On March 6th she passed her urine naturally, and there was five hours' interval between the emptying of the bladder. From that time to the present (September, 1899) she has passed water naturally, and can retain it without distress for seven hours.

In studying interstitial changes in the uterine wall, and the invasion of the endometrium and submucosa with inflammatory products, as well as the extension of inflammation to the peritoneum, it is important to keep in mind—

1. The thickness of the muscular coat of the uterus. This is hard to define, in consequence of the intermixture of areolar tissue between it and the mucous lining on the inside, and the peritoneal tunic externally. It probably does not exceed 6 mm.†

2. The thickness of the mucous membrane and the large interspersion of muscular fibres throughout it.

* *Transactions Obstetrical Society*, vol. lx., 1899, p. 227.

† Quain's 'Anat.,' 10th ed., vol. iii., part iv.

3. The concentric arrangement of the fibres at the orifices of the Fallopian tubes, and the transverse sphincter fibres at the external and internal os.

4. The greater firmness of the cervical mucous membrane as well as its hardness, as compared with that of the body, and the stratified character of the epithelium of the lower portion of the cervical canal, and the presence of numerous vascular papillæ.

Uterine fibroids, collections of fluid or old effusions in Douglas' space, relaxation of the utero-sacral supports, will also throw the uterus forwards, and press it against the bladder. How obviously prudent, then, is the general rule *in all cases of vesical trouble in women, where no other explanation is otherwise afforded, to make a vaginal examination and ascertain the condition of the uterus.*

The ready manner in which slight swelling of the mucous lining of the narrow canal of the isthmus uteri may cause its closure and imprison secretions, forces on us the importance of the safe rule, *always to dilate the canal of the cervix before internal medication of the cavity of the fundus*, and to maintain that dilatation when there is any suspicious flow, especially of a hæmorrhagic character, from the interior of the uterine cavity.

This same fact shows how futile are those abortive attempts to treat mechanical dysmenorrhœa associated with sterility, or ordinary congestive dysmenorrhœa consequent upon stenosis of the os uteri, by any of those playful slitting operations of the cervix that do not reach the real cause of the obstruction, disappointing alike the patient and practitioner. The stress laid on the essential axiom, to thoroughly divide the canal of the cervix uteri and to maintain its dilatation, in cases of stenosis, was one of the features in the impressive teaching of the late Marion Sims, a passing tribute to whose memory and genius, having known him personally for some years, I desire to make.

THE UTERINE LIGAMENTS AND THE PELVIC FASCIA.—While the mechanical purposes secured by these ligaments in supporting the uterus and maintaining it in position are not forgotten, more especially the utero-sacral, broad, and round ligaments, there are some other matters connected with their attachments and relations that must not be overlooked. The uterus is mainly prevented from falling downwards and forwards by the utero-sacral folds of peritoneum. In the dragging and stretching of these we have doubtless a ready explanation of the characteristic sacral pain so frequently complained of. The vascular and sensitive round

ligaments contribute their share to the support of the uterus, and may serve to favour conception (Rainey), through the muscular

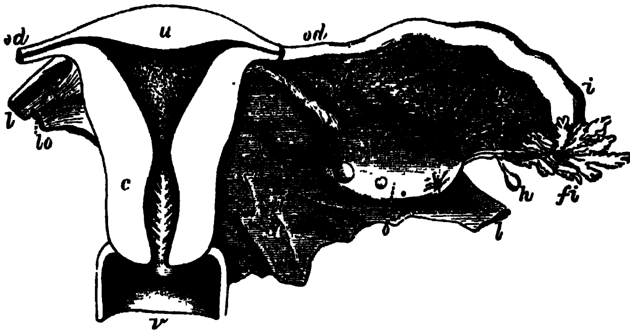


FIG. 13.—UTERUS AND APPENDAGES. Diagrammatic view (Quain's 'Anatomy').

power with which they are endowed, in altering the direction of the uterus. When they are put on the stretch and dragged on, in displacements and in procidentia, we have a satisfactory clue to the



FIG. 14.—VASCULAR RELATIONS OF UTERUS, OVARY, AND FALLOPIAN TUBE, SEEN FROM THE FRONT. Ur., ureter; U.A., uterine artery; U.V., uterine vein; O.A., ovarian artery; O.V., ovarian vein. (From Howard Kelly.)

pain complained of as running in the course of these ligaments, so frequently accompanying congested states both of the uterus and

ovaries. (The reader will find these points more fully referred to in the chapter on Retroversion of the Uterus.)

Remembering the disposition of the pelvic fascia, we can understand the association between over-distended conditions of the bladder and uterine discomfort, from the connection of the bladder and uterus through the utero-vesical ligaments, while the general distribution of the uterine and pelvic peritoneum, and the intimate association between it and the extensive fascia of the pelvis, offer a ready explanation of the rapid transitional phases of uterine and pelvic inflammation—metritis passing into perimetritis, and general peritonitis as a sequence to both. From the broad ligaments above to the sciatic notches below, we have the complete continuity of the cellular tissue maintained. A match struck at one end of the train quickly lights the mischief that with lightning rapidity often spreads until the entire pelvic viscera are involved. They are thus pushed and pressed against each other by the effusion, the force of the conflagration being still further heightened by the adjacent peritoneum taking on inflammation, and a localized or general peritonitis ensuing.

Infra-Vaginal Portion of Uterus and Os Uteri.—The infra-vaginal portion of the uterus, or that projecting into the vaginal passage, has, at the apex of the rounded cone, the opening leading to the canal of the uterus. The importance of the division of the cervix uteri into a supra-vaginal, infra-vaginal, and intermediate portion, is obvious when we consider the pathology of prolapse or hypertrophic elongation. The infra-vaginal portion varies in length, but it may be taken at from half to three-quarters of an inch. By the length and shape of this vaginal portion, and the character of the os uteri, we can form a fair opinion of the condition of the uterus. Its shape and size may be altered; either it is shortened, or, on the other hand, hypertrophied and elongated. Instead of the characteristic sensation of yielding a little to the finger, it may be either very soft, or, on the contrary, hard and resisting. Take as an example of the former condition the uterus of pregnancy, and of the latter the hardened cervix in fibroma, or the characteristic hardness of schirrus. It may be nipple-shaped, as in many cases of fibroid, and the infra-vaginal portion appear to the examining finger to move over the body of the uterus, like the nipple of the breast, or the skin over a hard mammary tumour. The conical form may be lost, and we search for the small 'pinhole' orifice of the os uteri, and detect it at times with difficulty. Or the short cervix runs sharply to a pointed cone, in the very apex of

which is the orifice of the os externum. To digital touch the os uteri varies in shape, size, and character, from the typical os uteri with its anterior and posterior lips running transversely—giving to the finger (Cruveilhier) a sensation like the feeling of the cartilage at the end of the nose—to the mere slit, slight fissure, or small circular aperture, and occasionally absence of the orifice and atresia of the uterine canal. With this congenitally small opening and cervix we mostly find associated dysmenorrhœa, ovarian pain, and sterility. In multipara the os may be large and dilatable, admitting the point of the finger; or fissured and lacerated as a consequence of labour or instrumental delivery. In pregnancy it partakes of

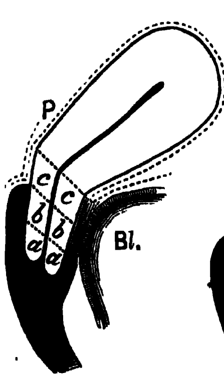


Fig. 15.—Diagram of Uterus to show Division of Cervix. *a*, infra-vaginal; *b*, intermediate; *c*, supra-vaginal; dotted line shows peritoneum (Schroeder).



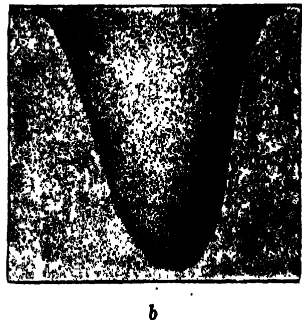


Fig. 16.—Congenital Stenosis: pin-hole, os uteri (*a*); common form of conical cervix (*b*).

the characteristic general softening of the cervix, and hence it has more of a velvet-like feeling, and is soft and patulous. It is frequently filled with tenacious mucus, which, in varying degrees of ropiness, hangs from it, and is so difficult to remove—a frequent cause of sterility. The lips of the os uteri may be eroded, the epithelium partly denuded, and a vascular villous surface exposed, leading to a granular state of it and the surrounding cervix. In such a case the os uteri bleeds readily, and on the slightest touch, partaking of that congested state of the entire cervix which is present with varying degrees of cervical endometritis. In any case where, from the nature of the discharge or other symptom, we suspect an erosion of the cervix to be present, it is safer to use the

speculum, and not to trust to the finger's sense of touch, which is deceptive. (See chapter on Erosion.)

UTERINE AND VAGINAL SECRETIONS.—There are some general considerations that bear on our knowledge of normal uterine and vaginal secretions and discharges. It is well to remember the close and intimate connection, permeability, and porous nature of the

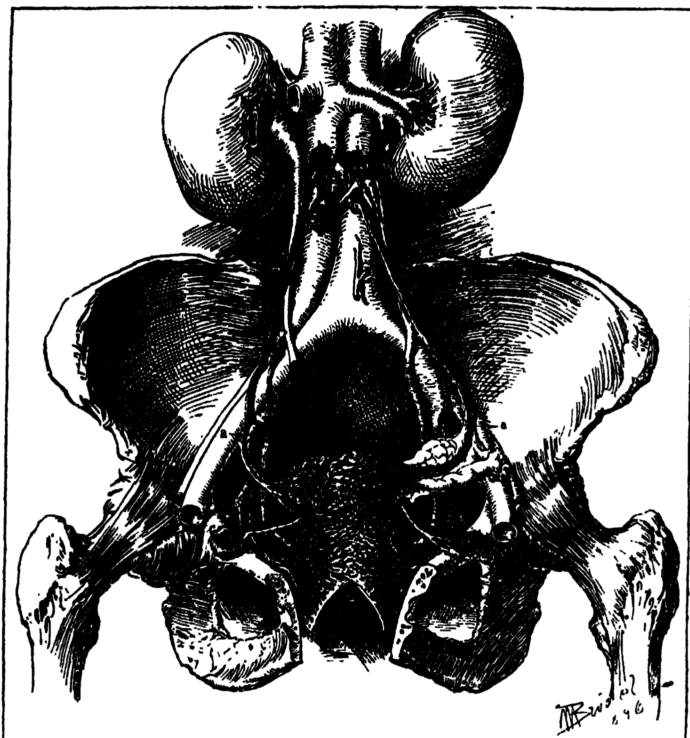


FIG. 17.—LYMPHATICS OF THE PELVIC ORGANS.* (Howard Kelly.)

uterine tissues. This is of importance, and explains those metritic troubles which have arisen after intra-uterine medication, independently of the passage of any fluid into the Fallopian tube. The size of the uterine veins throws light on the frequent occurrence of thrombosis and septicæmia.

* Shows the lymphatics accompanying the arteries and the anastomoses with the lumbar glands; the dense ramifications on the uterine wall and their anastomoses with the above or traced downwards to the inguinal glands. The tributaries of communication of the lymphatics of the external genitals and lower part of the vagina likewise reach the inguinal glands.

The large number of lymphatics distributed throughout its tissues, and their free communication with the lumbar and pelvic ganglia, render this organ peculiarly prone to septic absorption. Now that the operation of curettage is so frequently performed, this anatomical fact should be kept in mind. 'Scraping' of the womb, an unfortunate term that has now passed into popular use, is so commonly resorted to that the need for special care in previous dilatation and strict antiseptic precautions are apt to be overlooked. Elsewhere in dealing with the operation of curettage this caution is emphasized. The normal mucous plug that fills the cervix uteri helps to ward off septic change by preventing the admission of air into the uterine cavity. It comes from

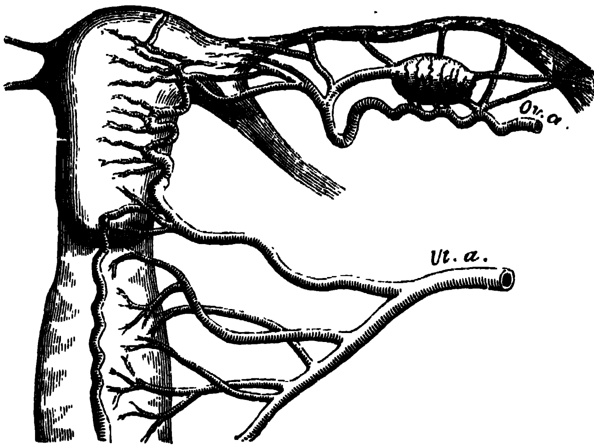


FIG. 18.—DIAGRAM OF THE VASCULAR SUPPLY OF THE VAGINA, UTERUS AND OVARY. (Modified from Hyrtl.)

the cervical glands, is alkaline, is washed away by the menstrual flow, and does not interfere with the passage of the spermatozoa. Elsewhere (see chapter on Sterility) the effect of the vaginal and cervical secretions on the spermatozoa in causing sterility is referred to. The epithelium found in the discharge is dentated.

The mucous membrane of the cavity of the uterus and of the Fallopian tubes secretes, on the contrary, a whitish alkaline mucous, not so tenacious, with columnar ciliated epithelium contained in it. This secretion is often profuse, and, on examination with the speculum, we see it poured out in quantity from the uterus.

Very different is the secretion commonly found at the fundus of the vagina, and the neighbouring cervix uteri. It comes from the

outer surface of the cervix and adjoining vaginal wall. The epithelium is squamous, the reaction is acid. The remainder of the vaginal mucous membrane secretes an acid (squamous) mucus, and the sebaceous glands of the vulva pour out an oily secretion. (I shall say more of these discharges further on.)

THE FALLOPIAN TUBES OR OVIDUCTS are situated in the broad ligaments, and, floating free in the pelvis, 'they enter the uterine wall at their inner ends. Traced from the uterus, they pass almost horizontally onwards for a distance of from half an inch to an inch, until they reach the side wall of the pelvis, after which they ascend, frequently in a tortuous manner, in front of their corresponding ovaries, and then arch backwards from these glands, and, internally, to their suspensory ligaments. Turning downwards, the

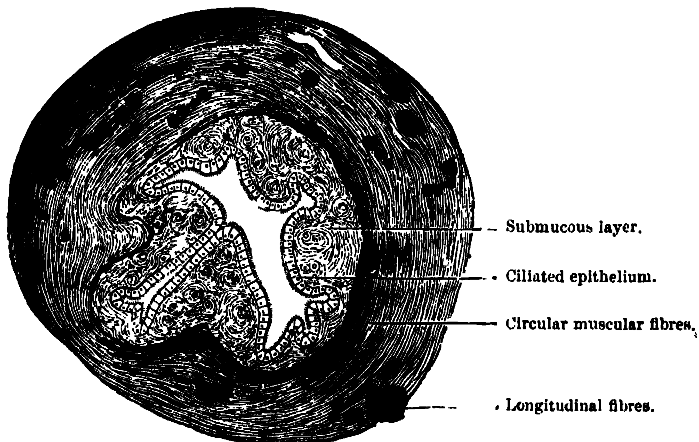


FIG. 19.—NORMAL FALLOPIAN TUBE IN SECTION. (× 10 diameters.) (Macalister.)

fimbriæ are opposite the inner surfaces and posterior borders of the ovaries' (Quain).

The Fallopian tubes are liable to twists and bends, and to contract adhesions to adjacent parts, while their connection with the ovaries and uterus renders them liable to every influence which any change in the position of these latter organs exerts.

The different portions of the Fallopian tube, the isthmus, ampulla, neck, and fimbriated end, all have their clinical and pathological interest for the surgeon. These various points will come into prominence in the discussion of morbid states of the tubes and the arrest of the ovum in any part of them in ectopic gestation. (See chapter on the Fallopian Tubes for note on the structure of the walls of the tubes and the anatomical appearances, shown in section.)

Owing to the small calibre of the uterine portion of the tube (0·12 of an inch in diameter), and the fact that its orifice is filled with mucus, it follows that fluid is, as a rule, prevented from passing from the uterine cavity into the Fallopian tube. If this plug be disturbed, or the tube be more patent than usual, fluid may then readily find its way into the peritoneal cavity.

Tyler Smith, recognizing the patent condition of the uterine orifice, suggested catheterization of the tubes in cases of obstruction, tubal gestation, etc. Matthews Duncan drew attention to this abnormal patency, and pointed out that it affords an explanation of the passage of the sound out of the uterus in certain cases. This I satisfied myself of in a woman sent for operation for ovarian tumour. The sound passed on several occasions readily its entire length, though the uterus was not enlarged, as was proved on operation. The explanation lay in the passage of the instrument into the peritoneal cavity through the patent tubal orifice.

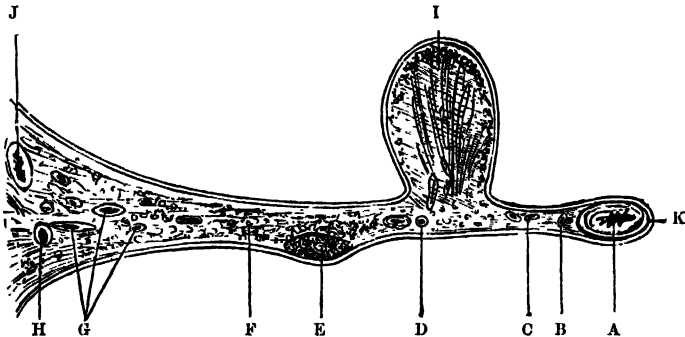


FIG. 20.—VERTICAL SECTION THROUGH THE BROAD LIGAMENT. (Anderson.)

A, Fallopian tube; B, tubal branch of ovarian vessels; C, parovarium; D, ovarian artery; E, round ligament and funicular vessels; F, connective tissue and unstriped muscle (utero-pelvic band); G, uterine veins; H, uterine artery; I, ovary; J, ureter; K, reflected peritoneum.

Repeated attacks of salpingitis, recurrent pelvic peritonitis with consequent adhesions, influence the size, position, and patency of the tubes and their power of grasping the ovary. We frequently find, in cases of sterility, thickened states of the broad ligaments, adherent ovaries, contractions and adhesions in the vaginal roof. The menstrual secretion may thus be retained in the Fallopian tube. This retention and various other causes may lead to its dilatation, while fluid accumulation and cysts are occasionally the cause of its distension, as occurs in hydro-salpinx, hæmato-salpinx, pyo-salpinx. The causes and consequences of tubal pregnancy are discussed in the chapter dealing with this complication. The occurrence of salpingitis, as a consequence of inflammation of the

cavity of the uterus, and especially as a sequence of gonorrhœal infection, is also readily understood.

I have just removed the right adnexa from a lady otherwise healthy. The Fallopian tube was considerably enlarged and distended by a hæmato-salpinx. The ovary also was very enlarged, and the cause of this condition was primary tubercle of the Fallopian tube. (See chapter on Affections of the Fallopian Tubes.)

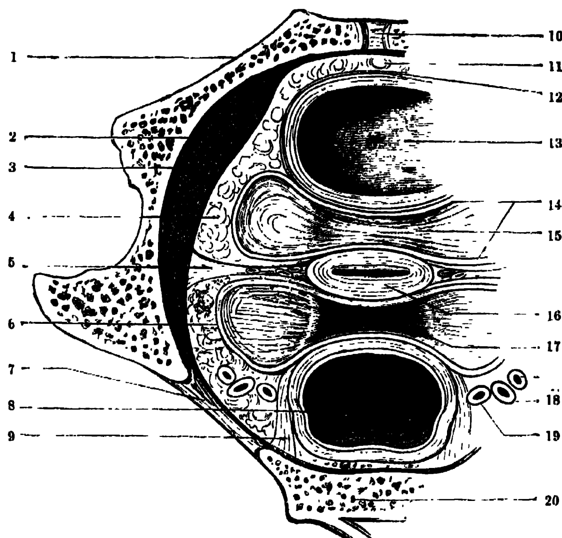


FIG. 21.—SECTION OF THE PELVIS SHOWING THE LIGAMENTS OF THE UTERUS. (Anderson.)

1, Os pubis; 2, obturator internus; 3, obturator fascia; 4, sub-peritoneal tissue; 5, utero-pelvic ligament; 6, peritoneum; 7, sacro-sciatic ligament; 8, rectum; 9, utero-sacral ligament, running forward into recto-uterine ligament; 10, symphysis; 11, revesical fat; 12, bladder wall; 13, vesical cavity; 14, peritoneum of utero-vesical pouch; 15, utero-vesical ligament and broad ligament; 16, uterus; 17, Douglas' pouch; 18, vessels; 19, ureter; 20, sacrum.

THE OVARY.—The ovary at either side of the pelvis is in its normal state about the size of a large almond, weighing from 80 to 100 grains. The position of this gland, whether its long axis be vertical or situated obliquely and parallel with the iliac vessels, is differently described by His and Kolliker. In old age the gland atrophies and becomes fibrous. Its exact position is determined by the surrounding viscera and the position of the uterus, though the gland, as a rule, lies posteriorly and laterally in the pelvis, the left being in close proximity to the rectum, and about 1 inch from the uterus. According to Henle, there are some 72,000 Graäfian

follicles in the two ovaries. The escape of the ovules and the ovum gives us the false and the true corpora lutea. The process of ovulation is accompanied by the rupture of one of these follicles. These periodical ovarian enlargements are attended by increased flow of blood to the ovary, temporary congestion, and an increase in its weight. Should the Fallopian tube not grasp the ovary when this follicle has ripened and burst, the ovule may fall into the peritoneal cavity, or blood may escape into it. The ovary and the uterus have such intimate connections, both in their peritoneal coverings and in the arterial and venous supplies (the utero-ovarian arteries and veins), that any congested condition of the one must



FIG. 22.—FROM HOWARD KELLY, SHOWING OVARIAN ARTERIAL SUPPLY AND DISTRIBUTION OF THE OVARIAN ARTERY.

react on the other. This is seen in the contemporaneous and relative increase in size of the ovarian arteries and veins during gestation. Taking this vascular association of the ovary and uterus into consideration, with the equally close lymphatic distribution of both ovarian and uterine lymphatics through the lumbar glands, we have no difficulty in understanding how purulent and septicæmic processes commencing in the uterus influence the ovaries, or the manner in which such a condition as gonorrhœal inflammation, if unchecked, is generally attended by a greater or less degree of salpingitis and ovaritis. In the large vascular supply of the ovaries,

and the periodical alteration in the quantity of blood circulating through the ovarian stroma—a blood-supply which is frequently



Fig. 23.—Ovary of a Woman Twenty-three Years Old, with the Fallopian Tube in Position. Natural size. (Bland Sutton.)

depraved—we see a reason for the many morbid changes occurring in the ovarian tissues, and which are associated constantly



Fig. 24.—Ovary of a Woman Forty Years of Age. Natural size. (Bland Sutton.)

with vicious menstruation. On the one hand, we find congestion leading to hypertrophy, hyperplasia, and sclerotic states;

ovarian apoplexy, rupture of vessels, the formation of cysts or fibromata; on the other, anæmic conditions tending to irregular, arrested, or suppressed menstruation. Our knowledge of the physiological function discharged by the ovaries, and the intimate dependence of the woman's physical and mental health on the nature of the menstrual act, forces us to regard, as of primary importance to a woman's physical well-being, the health of her ovaries, and the correct discharge of the function of ovulation. One of the greatest advances in this nineteenth century in gynæcological science was the operation of removal of the ovaries, first proposed by Battey, of Georgia, for inducing the premature change of life in woman, in various morbid states of both uterus and ovaries. With this step the name of Lawson Tait is inseparably connected, as he first insisted on the part played by the Fallopian tube in the act of menstruation, and the need for its complete removal together with the ovary, in the operation for removal of the uterine appendages. Of later years the conservative operations on the ovaries and Fallopian tubes (to be fully described further on) have revolutionized the surgery of the adnexa. To remove only such adnexa as are diseased and dangerous, and to conserve, as far as possible, healthy organs, by resection both of the tube and ovary, are the principles which guide the surgeon.

Ovulation and Menstruation.

Process of Ovulation—General Observations.—To comprehend any deviation from a normal and healthy act of nutrition of any organ, we must clearly understand the processes involved in the normal discharge of its functions, and the anatomical and histological facts bearing on that act of nutrition, from its incipient stage to its completion. To no physiological process does this rule apply more closely than to the deviations commonly met with in the menstrual act of ovulation. Perhaps the most perfect example of a nutritive process, elaborated through the healthful interchange of function, on the side of the circulating current on the one hand, and the tissues and the nerve elements on the other, is offered in the completion and perfection of the act of ovulation.

At a certain period of female life, varying generally from the twelfth year to the seventeenth, known as that of puberty, a sanguineous excretion occurs from the uterus. I have, however, known several instances of menstruation occurring from the eighth

to the tenth year. Barnes has recorded a case of a girl aged eleven, in which the catamenia commenced at sixteen months and continued regularly. Mengus has reported regular menstruation in a child twenty-three months old. A case of menstruation on the second day after birth has been recorded by Thum. The discharge was sticky, and oozed from the vagina. On the third day of its appearance from one drachm and a half to two drachms of bloody mucus passed, the flow disappearing on the fifth day.*

Though not strictly appertaining to this subject, I may here mention the fact that, with my friend Gelston Atkins, of Cork, many years since, I induced labour on the 250th day in a girl of twelve years of age. She was delicately formed, and the pelvis was narrow; the forceps had to be used. The child survived only a short time. The young mother, who was never told what was the nature of her 'tumour,' was kept under chloroform from the time labour set in; the milk was suppressed with belladonna, and, so far as I know, she never discovered the nature of the operation on her.

This flow of blood is an outward and visible sign of the completion of the ovarian function of ovulation, or the full development of a Graäfian follicle, its rupture, and the escape of the ovum. Attendant on the first appearance of this catamenial flow, changes appear in the mental and physical nature of the girl: it is the springtime of her existence; and her whole system participates in the budding forth of her sexual life. There is a hyperæmia of her sexual and mammary organs. Local congestions may occur in the ovaries, uterus and rectum; remote excitations in other organs, as the brain, heart, and lungs; reflex disturbances, having their origin in the ovaries, and irritation of the ovarian nerves.

This recurring hyperæmia of ovary and uterus, with the associated vascular and nervous disturbances, continues for some thirty or forty years of the woman's life—her summer. And now we approach the critical autumn time, when this fertilizing process begins to wane, and gradually ceases altogether—the period of the menopause, from forty-five to fifty, or thereabouts, when again we find her subject to local and remote congestions, cerebral affections, vicarious hæmorrhages from various organs, cardiac complications; at the same time occur exaggerated reflex disturbances and nervous 'discharging lesions.' These accompany that 'change of life'† during which are developed those traits of womanhood which stamp with peculiar and characteristic features the period antecedent to

* *Ann. Univ. Med. Sci.*, vol. ii., 1895.

† See remarks on the Climacteric.

the winter of old age. It is not, however, to the change in the uterine mucous membrane, and the periodical hyperæmia of the uterine tissues, with the consequent flow of blood, that we are to look for an explanation of these phases and phenomena. It is to the antecedent act of ovulation. True, a woman may menstruate (in so far as a mere periodical flow is concerned) without ovaries, but then it is most probably the mere perpetuation of a habit. As a physiological act it has lost its prime significance. It is on the ovaries rather than on the uterus that the gynæcologist has to concentrate his attention, in investigating the normal, and in treating the abnormal, menstrual molimen. We do not find any accurate explanation of many of the phenomena of menstrual life. There is a something in these not to be explained by any anatomical or physiological facts connected with ovulation. The effect of its mysterious influence on the entire being of the woman may not be measured by any descriptive language. The explanation is not in the swollen and sensitive ovary, nor in any changes that occur in the parenchyma, in the maturation and rupture of the Graäfian follicle, in the accompanying congestion of the Fallopian tube, nor yet in the swelling, proliferation and disintegration of the epithelium of the uterine mucous membrane

This strange coincidence, of a mental and physical state being closely dependent upon the healthful discharge of the function of a single organ, is best recognized when we watch the consequences of perverted action, or of any arrest or suppression of the ovarian function. 'The *essential thing*,' as Schroeder says, '*is the discharge of the ovum;*' the escape of blood from the mucous membrane is an accessory occurrence which is, perhaps, only the indication of the retrograde metamorphosis of that membrane. Conception may occur while the external evidence of ovulation is absent, as we have seen that the menstrual flow may periodically appear when the ovaries are removed. The congestion of the ovaries and other genital organs may take place with the discharge of the ovum, while there may be no laceration of the uterine vessels, and the usual escape of the disintegrated mucous membrane may not follow. From these few brief remarks we can infer how important to the health and well-being of the woman is the due performance of this function on the part of the ovary. Though we do not regard the uterine changes and flow as of the same essential significance, yet, remembering the hyperæmic condition of, and the local determination of blood to, all the genital organs at the time of menstruation,

we can comprehend how serious may be the consequences of a partial or complete suppression of this escape of blood from the uterus, the arrest of the normal process of disintegration and exfoliation of the uterine mucous membrane, and the resulting retention in the blood of the abnormal elements of excretion.

*Senile Changes in the Ovaries.**

According to Otroschkevitch, the lessening of both ovaries in old age arises in connection with increased growth of fibrous connective tissue and the predominance of this over the degenerating follicles. The disappearance of the epithelium covering the surface of the ovaries is a true change in the senile ovaries. The desiccation of mature, and the wholesale degeneration of the primordial, follicles are important factors in the change of the ovary of the aged. There is hyaline degeneration of the arteries and fibrous tissue advancing with the age. Deficient nutrition of the ovary leads to fatty degeneration of the cellular tissue.

Menstruation generally occurs from puberty to the ages of forty-five or fifty, every twenty-eight days or at a longer interval (quite compatible with health). The discharge lasts from three to seven days, or longer. It consists of blood and disintegrated débris of uterine mucous membrane, the quantity of which varies with the duration of the flow. It is influenced by climate, temperament, coitus, habits and rank of life, temperature, blood-states (as the exanthemata, phthisis, Bright's disease, chlorosis, anæmia, leukæmia),† mental influences (as depression, shock, hysterical condition, the effects on the mind of illicit intercourse and seduction); local disorders of the genital organs and rectum (as fibroid developments, uterine version and flexion, hyperplastic states of the uterus); morbid growth of, or abnormalities in, the development and position of the ovaries; any congenital or acquired stenosis or atresic condition of the genital canal from the Fallopian fimbriated orifice to the vulva.

For the normal menstrual act to occur without any aberrant signs or symptoms, there must be perfect relation of blood-supply, both in character and quantity, and healthful control of nervous influence, not only on the part of the nerves distributed to the

* *Vratch*, 1896, No. 5.

† While the psychological importance of the establishment of the menstrual function in women who are mentally affected cannot be overlooked, this fact, that the suppression of menstruation is often the consequence of the abnormal psychical state, and not its cause, has to be remembered. I refer to these psychological correlations further on (consult chapter on Oöphorectomy).

various tissues involved—arterial, muscular, cellular—but on that of the central nervous system. Nowhere is this made more manifest than in the influence exerted on the ovary and uterus during mental states, reflex disturbances, or shocks, which show their immediate effects in arrested and perverted menstruation. It is outside the scope of this work to enter into a detailed description of the physiological function of ovulation and the associated process of menstruation. This is more distinctly a portion of the physiological course of the student, and is dealt with in a more perfect manner in treatises on physiology than I could possibly hope to do in a work of this nature. It must suffice to remind the reader of certain anatomical and physiological facts, connected with the act of ovulation, which bear on some of the clinical phenomena of menstruation, and the deviations from its normal occurrence, which the gynæcologist is called upon to treat.

Various Views on the Physiology of Ovulation and Menstruation.

Landois and Stirling, in the 'Text-book on Human Physiology,' adhere to the views of Kundrat and Engelmann, that there is a fatty degeneration of the superficial layers of the mucosa, the new mucous membrane being developed from these deep layers when the period is over.

With regard to the relation borne by the ovaries to the general well-being of the woman, and the connection between these circulatory changes and those occurring in the Fallopian tubes and uterus, I think it well to epitomize from this text-book this summary of views bearing on the subject :—

1. The partial contraction of the muscular tunic of the Fallopian tube assists in the propulsion of the ovum.
2. The bloodvessels of the Fallopian tubes are then injected, possibly by the constriction of the vessels in the broad ligaments, by their non-striated muscular elements. (Rouget.)
3. Pflüger's view is that the physiological 'freshening' of the uterine mucous surface affords nutriment to the newly-received ovum.
4. Reichert's view (and that of Engelmann and Williams) is that the change in the uterine mucous membrane is a sympathetic one, resulting in sponginess, vascularity, and swelling. Thus is formed a *membrana decidua menstrualis*, which is not disintegrated unless the ovum be fertilized, and hence there is no external discharge, this negative sign being the proof of fertilization under normal conditions of health. The occurrence of ovulation and menstruation may not be synchronous, and hence there may be ovulation without menstruation, and *vice versâ*.

In connection with the anatomical process of ovulation, the views of Dr. Paul Strassman * are of interest. I am indebted for the translation to Messrs. John Taylor and Frederick Edge. †

'Ovulation can under certain circumstances take place before menstruation, the occasional occurrence of pregnancy in a girl who has never menstruated proving this. The spontaneously burst menstruation follicle is a bigger structure than that of the unburst follicle seen in ovaries removed by laparotomy. The translators have seen many follicles of 15 mm. in diameter. Sexual impulse and cohabitation can only be regarded as having a possible or questionable influence on ovulation. The ripening of the ovum and menstruation are always completely independent of sexual congress (Bischoff, Negrier, Raciborsky, Bouchet). Rupture of a follicle, and its dehiscence, may be accelerated by connection. Each menstruation is the expression of an ovulation. The uterus being dependent upon the ovaries for development and growth, it is only a step to conclude that heightened activity of the ovary calls forth a corresponding life expression of the uterus. In both this is periodical, so, consequently, is menstruation. It is a rhythmic life expression. Anatomical examinations on the number of corpora lutea, contrasted with the number of known menstruations, established the connection between ovulation and menstruation, a connection still further established by a majority of post-operative reports, which point to the same fact. Disturbances in the position and disease of the adnexa may cause deviations from the normal rhythmic menstrual act. Hence, intermenstrual pain was explained by Fehling as a normal ovulation between two menstrual periods. How common such pain is every gynæcologist is aware, and the relief of this symptom, as well as the pain of ordinary menstruation, by treatment of the ovaries, or their massage, is explained by the consequent changes of the relative position of the adnexa and uterus. A light is thus thrown on the different results which may follow the forcible and exhaustive examinations of the adnexa under anæsthesia. As I have said in the text, other authorities, as Slavjansky, Leopold, Miranoff, and Pflüger, regard ovulation and menstruation as quite independent events, menstruation being, according to these, a self-standing physiological phenomena, and various explanations have been advanced to explain the cases where menstruation takes place without ovulation. Leopold distinguishes between typical corpora lutea and atypical, the latter arising from unburst follicles whose walls have fallen together and only contain a little blood clot. The authors (Taylor and Edge) regard these latter corpora as pathological, and due to their removal from cases which had been operated upon, and they contend that evidence of the retention of an ovule on the follicle is wanting. Leopold and Miranoff adopt Pflüger's view that the movement of menstruation is due to the steady growth of the follicles, or the predominating growth of one follicle, a powerful blood congestion of the genitalia occurring, followed by menstrual changes in the uterus, and the secondary bursting of the follicle. Pflüger, in explanation of the periodicity of menstruation without ovulation, says that "menstruation occurs without ovulation when

* *Archiv. f. Gynak.*, bk. 52, ch. 1, 1896.
† *Brit. Gyn. Jour.*, p. 11, vol. xii.

no large corpus luteum happens to be present," and he adopts the "theory of a dynamic equilibrium of all organs, from which it follows that the ovaries carry a definite number of stimuli to the central nervous system any day." '

But, as the translators observe, recurring menstruation of a healthy woman is recognizable, that of ovulation is not; nor is it certain that the condition of the mucous membrane of the uterus in relation to expected conception can be regarded as normal. They hold generally to the view that the shedding of the ovum is periodical, like menstruation.

Menstruation, according to Strassman and others, is not an independent life expression of the uterus, and the bursting of the follicle is not due to menstrual congestion. Pregnancy occurs in amenorrhœic women, in children who have not menstruated, exceptionally in the menopause, and during lactation. There is no sudden evolution of the follicle, vascular development of the ripening process going on *pari passu.*

Other important points which are established in the work quoted are—

(1) That the opening of the follicle occurs independently of menstruation (Reichert, Leukardt, Waldeyer). Periodical increase of the ovarian activity, with swelling of the ovaries every fourth week, was noticed by Werthe in a case of hernia of the ovaries. The same fact was recorded by Englisch.

(2) That the ovaries decrease in volume during menstruation (Morell-Lavallee, Verdier, Barnes, Oldham). Blood pressure is reduced in the intermenstrual period. Palpation of the ovaries (Holst, J. Meyer) is easier during menstruation owing to their swollen condition. Hyrtl found a minute ovum in the interstitial portion of the tube on the fourth day of menstruation, long after the rupture of the follicle.

(3) It has been established (Leopold, Williams, His, Reichert) that a period of about two days may be taken as that generally occurring between the bursting of the follicle and menstruation.

(4) By a series of experiments, and the production of artificial ovulation in dogs, Strassman claims to have established that ovulation is the cause of the changes in the endometrium and genitalia observed during menstruation. Such changes are the consequence of excitation of the ovarian nerves, causing reflex vaso-motor excitation in the uterine arteries, and these nerve, and ganglionic and nerve, irritations proceed in the duly provided paths (Rohrig). The

nerve supplies of the ovaries and the ganglionic relations to the vessels favour these processes.

(5) The period of incubation from the rupture of the follicle until the appearance of menstruation is the time occupied in the development and completion of these physiological ovario-uterine changes. We find its analogues in the appearance of lactation, and in the pseudo-menstruations after operations.

Bland Sutton, in discussing the independence of the act of ovulation from the process of menstruation, says:—

'In the ovary of the human fœtus, ova ripen, form follicles, and undergo suppression during the last month of intra-uterine life. This has been observed by De Sinéty, Waldeyer, Beigel, and others. I have also assured myself of these facts, and have also detected a similar process in the ovaries of fœtal mammals, including forms as widely separate as kangaroos and lemurs, deer and donkeys, sloth and lions.

'The life of the human ovary may be divided into the following periods of activity and repose. The first period extends from the seventh month of intra-uterine life to the end of the first year. Ova ripen in such abundance that in some cases a marked diminution in the number of the ova is appreciable at the second year after birth. To this succeeds a period of comparative repose, terminating at the tenth or twelfth year; then the ripening of ova is again easily detected, and goes on independently of menstruation, even after the accession of the climacteric.

'In female monkeys and women ovulation and menstruation are probably independent processes. Maturation of ova from the period of puberty until senility is going on constantly, and the presence of a ripe ovum concurrently with menstruation is a coincidence. In a healthy woman a ripe follicle may generally be found in the ovary between the tenth and fiftieth year, independently of the menstrual period.

'The œstrus, rut, or heat, of mammals is a term applied to certain objective signs that the female will receive the male, and is usually associated with ovulation.

'Ovulation signifies the escape of mature ova from the ovary.

'Although these two processes may occur independently of each other, still, we cannot doubt but that they are physiologically associated, and it is a fact beyond dispute that if the ovaries and Fallopian tubes be removed from a woman who has menstruated with the greatest regularity for years, and is still in the bloom of sexual life, we may predict with almost absolute certainty that menstruation will cease.'

As the result of his investigations on monkeys, he came to the conclusion that the mucous membrane is not disintegrated to the extent previously represented, and that only the epithelium is shed, while the utricular glands are enlarged, and blood is discharged from the denuded epithelial surface. Arthur Johnstone * regarded the endometrium above the os internum as a cytogenic membrane and belonging to the class of so-called adenoid

* *Proceedings of the British Gynæcological Society*, June 23, 1886.

tissues, 'menstruation being for it what the lymph-stream is to the lymph-gland, or the blood-current to the spleen.' He gave as the simplest definition of menstruation, 'a periodic wasting of those corpuscles that are too old to make a placenta.' The epithelium alone is shed, and the mucous membrane is not disintegrated. 'The Fallopian tube undergoes no structural change during menstruation.' *

In a paper read before the Gynæcological Society of Great Britain, on 'The Coincidence of Ovulation and Menstruation,' Lawson Tait reviewed the physiological results in fifty-one cases of oöphorectomy with removal of the appendages. Miss Clark made most careful dissections of the ovaries, and noted the condition of the corpora alba and corpora lutea. In all, the ovaries were practically destroyed. Tait came to the conclusion, from these dissections, that in menstruation we are dealing with a function associated with the uterus and Fallopian tubes, inasmuch as menstruation and ovulation were only 'coincident' in twenty-six out of the fifty-one women; in seventeen they were not coincident; eight were doubtful. I must, however, add that such pathological evidences, while they support the other proofs of the uterus being the prime menstruating organ, do not appear to me to invalidate the clinical importance of other physiological facts that establish the relationship between ovulation, at whatever time it takes place, and the menstrual flow. Lémière explains such persistence of menstruation after removal of the ovaries and tubes by an organic habit of the nerve-centres and uterus, enabling the latter to discharge the function.

Byron Robinson has written some thoughtful papers in the *Medical Brief* on the 'Abdominal Brain' and 'Automatic Visceral Ganglia,' in which the aberrations of the menstrual functions in women are ascribed to the nervous supplies of the ovaries and uterus, arising in what he terms 'the abdominal brain,' and the renal and abdominal plexuses of the sympathetic nerve. This source of nerve-disturbance is in a condition of hyper-excitation at certain times, especially during the menopause. During this time the woman suffers from perverted nutrition in her sexual organs, and slight peripheral excitations are sufficient to originate reflex disturbances. The obvious deduction to be drawn from these physiological correlations is, that while soothing any local painful and irritating states in the organs within the pelvis, we have often to look outside these to the general nervous system for collateral visceral neuroses elsewhere during the critical times of puberty and the climacteric.

Martin of Birmingham insists on the dependence of menstruation on a special nervous supply, issuing from a special nerve centre in the lumbar portion of the spinal cord, the arrest of the function after oöphorectomy depending upon section of the menstrual nerve. He believes that either the pelvic splanchnics or the ovarian plexus are the roads through which the menstrual impulses travel to the uterus. He urges that all the physiological facts connected with menstruation point to this control by a special nerve centre.

* 'Diseases of the Ovaries and Fallopian Tubes,' 1896.

Pseudo-menstruation.

These explanations of pseudo-menstruation are given :—

In the case of large tumours the overfilling of the vessels of the pedicle (Olshausen) leads to congestion and bleeding. The weakness of the heart action and the reduction of the intra-abdominal pressure may assist this overflowing of the uterine vessels. The view of Issmer and Veit is, that by the removal of the ovary with a ripe follicle we practically induce the menstrual act, and the incubative period explains the delay in appearance.

All these arguments support the view always advocated in previous editions of this work, and reiterated in the present, that from the ovary, through its physiological function of ovulation, is issued the mandate for the visible act of menstruation to commence, and that it is to the ovary rather than to the uterus we have to look for the explanation of the various physiological and clinical phenomena which at puberty, in adult life, and at the menopause, are centred in the appearance of the menstrual act.

TRANSPLANTATION OF THE OVARIES.—E. Kuaner has come to the conclusion that—

'(1) In rabbits transplantation of the ovaries is completely possible into places foreign to, and differing from, their original site.

'(2) Ovaries become acclimatized singularly well if they are only placed in the abdominal cavity or anywhere among muscles.

'(3) Ovaries thus growing in a new place receive proper nourishment and functionate properly, as is seen by the presence of ripening, and even rupturing, Graäfian follicles.' *

THE INTERNAL SECRETION OF THE OVARY. — Curatullo and Tarulli † have reviewed the entire question of the influence of oöphorectomy upon the metabolic phenomena in the organism, as, for example, on the respiratory products, the body weight, and the elimination of phosphates, and have arrived at the conclusion that removal of the ovaries has a marked influence on metabolic phenomena. The greatest effect is on the elimination of phosphorus, which is diminished; the elimination of carbonic acid, and the absorption of oxygen by respiration, diminish up to a certain point, and then remain in the same proportion without further change. The body weight is increased. The diminution of phosphates after oöphorectomy has suggested to Schauta and others this operation with or

* *Centralblatt fur Gynakologie.*

† *Annali di Obstetricia Ginecologia*, Oct., 1896; *Brit. Gyn. Jour.*, Feb., 1897.

without removal of the uterus as a cure for osteo-malacia, which Fehling has attributed to exalted ovarian functional activity, and consequent reflex effects on the vaso-dilators and constrictors of the medulla. There is a resulting increase of reabsorption of the calcareous salts, more particularly of the pelvis. The disease is a reflex tropho-neurosis of the skeleton, having its focus of reflexion in the ovary. The conclusions arrived at are:—

'The ovaries have, like other glands of the system, according to Brown Sequard's general law, an internal secretion. This is passed constantly into the blood, its chemical constitution being quite unknown, while its most essential characteristics are those of favouring oxidation of organic phosphorized bodies, of hydrates of carbon, and of fats. Hence it follows that (by removal of the ovaries or absence of their function, as before puberty and after the climacteric) there ought to be, on the one hand, a greater retention of organic phosphorus, and thus a greater accumulation of calcareous salts in the bones; and, on the other, the well-known occurrence of obesity following on castration or the menopause.' *

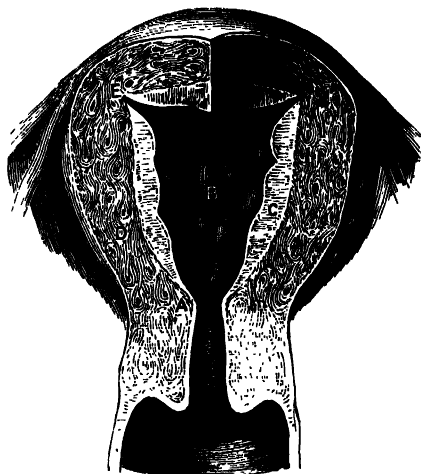


FIG. 25.—UTERUS DURING MENSTRUATION. A, mucous of the neck; B, mucous of the body; C, thickness of the mucous; D, tissue proper; E, thinning of the neck and at the Fallopian tubes. (Gallard.)

It is not to be forgotten that the uterus is capable of contraction under the influence of sexual intercourse, and the expulsion of some of the uterine mucus may thus take place. This reflex contraction may be associated with corresponding contraction of the Fallopian tubes. This has an important bearing on the question

* *Brit. Gyn. Jour.*, Feb., 1897.

of sterility and the effect of excessive or imprudent intercourse, which may thus cause loosening or expulsion of the ovum.

I had under my care a married lady, who, under certain influences, and generally associated with the catamenial periods, had violent uterine contractions, in which the vagina participated. I have seen the uterus driven down to the vulvar orifice, and it was difficult at these times to keep a speculum in the vagina. A digital examination was sufficient to bring on these contractions. Fearing that there might have been some intra-uterine polypus or fibroid, I dilated the uterus and explored the cavity, but there was no intra-uterine growth. She suffered from an old laceration of the cervix and some corporeal endometritis and menorrhagia. Free application of nitric acid to the uterine cavity materially benefited her, and relieved the spasms.

THE RECTUM.—In practice, the close sympathy that exists between the uterus and the rectum is often overlooked. I enter into the practical bearings of this sympathy on rectal operations in the chapter on the Rectum. The habitual neglect of the lower bowel, which is frequently met with in women, is the cause not only of constitutional, but also of many local disorders. Various dyspeptic troubles—headache, flatulent pain, functional heart palpitations, hæmorrhoids—follow from a congested portal system. A congested, hæmorrhagic, or an unnaturally dry condition of the mucous membrane is constantly found as the companion of different vaginal and uterine disorders. One organ reacts on the other, and the recognized difficulty in curing any rectal affection while a uterine diseased state continues, renders it imperative to relieve the former before we can hope permanently to benefit the latter. This is especially true of fissure, strictured states, fistula, ulcers, pruritus. But perhaps the complication most commonly met with is hæmorrhoids, both external and internal. These are more distressing when there exists at the same time any version or flexion of the uterus, particularly retroversion, the uterine pressure aggravating the rectal pain and discomfort. A rectocele associated with uterine prolapse or injury to the perinæal body is a not uncommon complication. The rectum is encroached on, and the act of defæcation is interfered with, in pelvic peritonitis with effusion, uterine fibroids, and by various accumulations in Douglas' pouch. Often in making our first thorough pelvic examination, having previously by an enema emptied the rectum, we gain our most important information by a careful rectal exploration. (See First Steps in Examination, and Remarks on Rectal Exploration in Children.)

THE URINARY ORGANS—DIFFICULTIES IN DIAGNOSIS.—The gynæcological student must have a sound practical knowledge of the

anatomy of the kidneys, ureter, and bladder. The more gynæcological surgery advances the more we see the importance of such an accurate acquaintance with the position and relation of these viscera. Various morbid states of the kidney, such as movable kidney, hydronephrosis, pyonephrosis, perinephritic abscess, cystic disease, are liable to be mistaken or overlooked in diagnosis. It is a matter of common occurrence for renal disease to complicate pelvic disorders. It is often extremely difficult to differentiate between the two. The same observation applies to the differentiation of renal and hepatic enlargements or tumours of these viscera. The frequent occurrence of a renal calculus giving rise to various reflex or transferred pains; the possibility of a renal tumour being mistaken for an ovarian cyst; the different morbid conditions for which movable kidney is liable to be mistaken—such, for example, as malignant disease of the colon, tumours of the gall-bladder, fæcal tumours, splenic tumours—are instances of this (see chapter on Renal Disorders).

Case of Hepatoptosis simulating Mobile and Enlarged Kidney, attended by Amenorrhœa and Recurrent Hæmatemesis.

In May, 1898, I brought before the Medical Society a case of recurrent hæmatemesis, due to complete hepatoptosis, discovered by laparotomy, with full particulars of the case, and a summary of the literature of the subject.* In this instance there had been gastric symptoms and amenorrhœa with general anæmia from the age of sixteen, and the hæmatemesis had first appeared in the nineteenth year, when it was looked upon as vicarious menstruation. I saw the patient in July, 1897. She was in a state of collapse, caused by profuse hæmorrhage from the stomach and uncontrollable vomiting. The physical signs I then noted are worth recording. The abdominal percussion note was resonant in every direction, save in the right hypochondriac, lumbar, and inguinal regions, and within the dull area there could be defined a fairly large movable mass, the edge of which was felt extending from the lower rib to the inguinal region. This edge appeared to be somewhat thin, giving the tactile impression usually experienced in feeling a large spleen. There was neither a renal nor hepatic line of demarcation, and the question of diagnosis resolved itself into the determination of a hepatic or renal enlargement, and to the latter view I rather inclined. The following September a thorough abdominal exploration was made, and it was then found that it was the edge of the liver, which extended from the costal cartilages to the iliac fossa, the right lobe being in the latter position. The gall bladder was found some three inches below, and to the right of its natural position. The vault of the diaphragm was found empty. The liver was raised out of its place and examined. It was darker in appearance than usual, and

* *Transactions of the Medical Society*, vol. xxi., 1898.

its surface was deeply injected. It was resting directly on the right kidney. The stomach was somewhat enlarged, and its vessels rather distended. Both kidneys were normal in size, and so was the spleen. The parts were carefully readjusted, and the abdomen was closed in the usual manner. The patient steadily improved after the operation, increased in weight, and from that time to the present has never suffered from any of her previous symptoms. I furnished her with an air-pad belt, which covered the more prominent part of the liver, and gave it support. How far the removal of the liver from the abdomen relieved some twisting of the suspensory ligament and affected the circulation in the hepatic vessels I cannot say, but the relief that followed upon the disturbance of the viscera and their replacement is certain.

But it is especially in view of the various operative procedures that have of recent years been undertaken for the relief of renal affections, both in the kidney itself and the ureter, that the gynæcologist must remember his responsibility, as physician, in diagnosing the disease, and advising an operation, or as surgeon in performing it. Only those who are frequently called upon to make a diagnosis can realize the difficulty there is in arriving at an accurate conclusion in some obscure cases of renal enlargements, if they be complicated with evidence of pelvic mischief, either remote or immediate. The vital importance of extreme care is obvious, as life may be sacrificed from the want of a simple exploratory incision, or the use of an aspirator.

Mobile Kidney—Complicating Uterine Disease—Persistent High Temperature—Supervention of Carcinoma—Nephrectomy.

The kidney I removed by nephrectomy in May, 1897, and the following are brief notes of the case: *—

The lady was married, and aged 40. First pregnancy in 1896. Since the labour the catamenia had been irregular, and in the intervals there was occasionally some brown discharge, which lasted about twelve days. The last catamenial period was in March, 1896. She had been under treatment since her confinement for an enlarged and mobile kidney. She was subject to occasional attacks of sickness, and there was a gradual but steady decline in her general health, attended by loss of weight. In June, 1896, being then under observation, there was noticed a constant nightly exacerbation of temperature, the daily range varying from 98° and a few points, to 100° and 101°. As there was then a suspicious discharge from the uterus she was curetted, and this step appears for some time to have had a slight beneficial effect on the temperature. But all through 1896, and, indeed, up to the time of the operation, this nightly exacerbation of from one to two degrees continued. The patient was under the observation of her

* *British Gynæcological Journal*, Aug., 1897. I was indebted for the case to Colonel Greany, I.M.S., Civil Surgeon, Poona.

medical attendant, Dr. Joubert, of Calcutta, in the latter part of 1896 and the early months of 1897, and his opinion, expressed in December, 1896, was, that the tumour was undoubtedly an enlarged and displaced kidney, probably disorganized, not of any use to her, and possibly a source of danger, though the grounds then of recommending an operation were not sufficiently strong. There was also the uncertainty as to whether her condition of health actually and solely depended upon the condition of the kidney.' In February of this year, when he again saw her, he was of the same opinion, though he suspected that there was fluid in the pelvis of the kidney, and, from the continued fever, possibly pus. He recommended her coming to England for observation, and, probably, exploration of the kidney or its removal. She never at any time had hæmaturia.

I saw her in April, 1897. The urine roughly examined was faintly acid, specific gravity 1011, with a very faint trace of albumen. On examination I found the uterus and adnexa healthy. There was a tumour protruding in the right inguinal, and extending back to the right lumbar region, with an irregular and notched anterior edge, solid to the touch and painless. The patient was greatly emaciated, and subject to occasional attacks of sickness, and for the last few weeks was becoming worse. I felt that the operation of nephrectomy would give her the only chance, and immediately recommended operation. Mr. Freyer and Mr. Bland Sutton saw the patient and agreed with my opinion. I feared that the growth was sarcomatous. On May 1, 1897, Mr. Bland Sutton kindly assisting, I removed the tumour by Langenbuch's operation. The left kidney was examined and found normal in size; the peritoneum was divided for the second time along the posterior border of the kidney, which was carefully freed from its capsule, and the adhesions which bound it posteriorly were separated by the finger and curved scissors, the vein was ligatured separately, the ureter and arteries were tied *en masse*, the peritoneal edges of the sac were brought together by fine silk interrupted suture, a drainage tube was passed from it through the loin, and the abdominal incision was closed by three layers of sutures. Ten ounces of urine were passed on the day of operation, eleven the following day, fourteen on the third day, and twenty on the fourth day. The temperature during the first week only once reached 99°, and the recovery was uninterrupted. She greatly improved in every respect, having gained flesh and appetite, and never had a single untoward symptom or complication. The report of the urine, taken on the fourth day after operation, and the pathological report, macroscopical and microscopical, of the tumour, made for me by Mr. Targett, are as follows :—

Analysis of Urine.—Reaction: Hyper acid, sq. gr., 1025; albumen, a trace; blood, absent; sugar, absent; urea, 2·85 per cent. (= 12·47 grs. per oz.); uric acid, 0·092 per cent. (= 0·40 grs. per oz.); ratio, 1: 31. Chlorine, 0·238 per cent. = sodium chloride, 0·392 per cent. (1·71 grs. per oz.). The centrifugalized deposit (after removal of urates by warming) contained abundant crystals of free uric acid and a few granular tube casts. Leucocytes were present in more than normal numbers, but there was no actual pus. Blood cells were absent. The epithelium present was of the ordinary squamous form, and no fragments of growth could be found.

Report on the Specimen exhibited.—The specimen consists of an enlarged right kidney, weighing 26½ ozs., and measuring 7 inches in length, and 11 inches in its greatest circumference. The enlargement is due to the presence of a new growth, which involves the lower two-thirds of the organ. This growth has a nodular surface, and is closely adherent to the fibrous capsule of the kidney, though it has not perforated the capsule. The hilum shows that the renal veins and pelvis are plugged with new growth. The cut surface shows that the renal substance is entirely replaced by growth at the lower end of the kidney. Microscopically, the growth is a very soft and degenerated carcinoma.

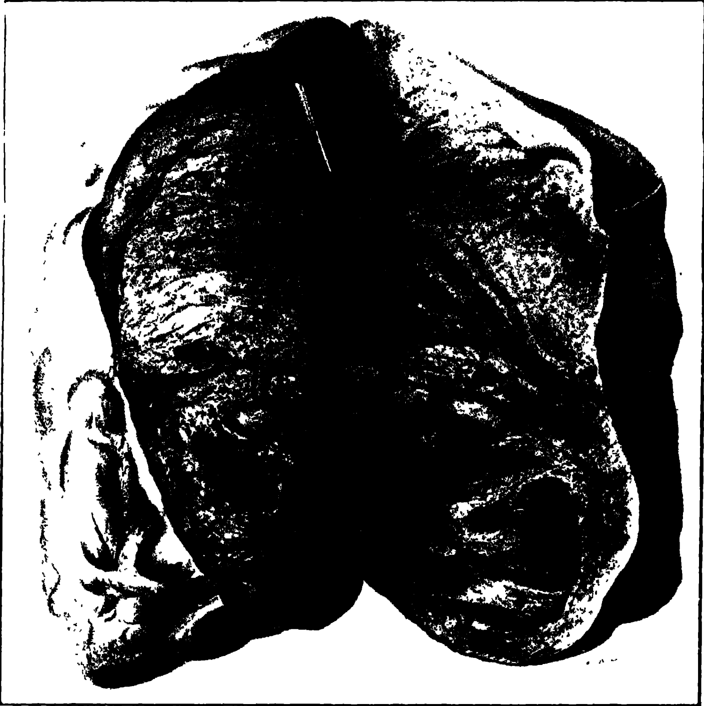


FIG. 26.—CARCINOMA OF THE KIDNEY SHOWN IN PLATE II.

Microscopical Report.—The section includes the edge of the growth and the adjacent renal tissue. The latter shows much interstitial nephritis, with atrophy of the glandular tubules and of the glomeruli. There are also groups of round cells scattered through the cortex.

The growth itself is a carcinoma of the 'convoluted tube' type, that is to say, it reproduces the epithelium and general arrangement of the convoluted tubules more or less distinctly. Some of the alveoli have a lumen, and are even diluted into minute cysts, which present simple villous ingrowths or

PLATE I.



A B

CARCINOMA OF THE KIDNEY. The kidney shown in section. The area of healthy structure is limited by a line drawn from A to B. Nephrectomy—recovery. (Page 42.) (Author.) [*To face p.* 44.

PLATE II.



Carcinoma of the Kidney. Showing the hilum and the renal veins invaded with new growth; the ureter was healthy and is seen cut across. Nephrectomy—recovery. (Page 42.) (Author.) [*To face p.* 45

papillomata. The majority of the alveoli are, however, solid, and are separated by thin strands of fibrous tissue traversed by capillary vessels. A noteworthy feature of the growth is the marked fatty degeneration of the cells; this is shown by their empty, unstained condition, due to the removal of the fat in the course of preparation of the specimen.

The case just narrated shows the care with which the differentiation of renal tumours has to be made. It demonstrates the importance of mobile kidney complicating disease in the uterus or adnexa. It also has a bearing on the influence this complication may exert on a difficult diagnosis when renal and pelvic disease are associated; and it is of great interest to the gynæcological surgeon, both from its clinical and pathological aspects.

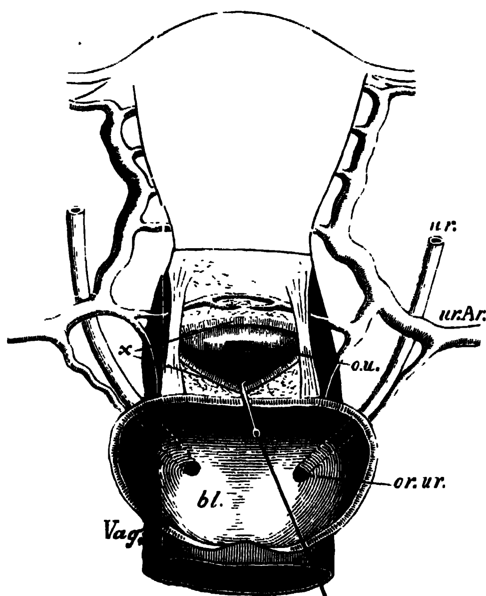


FIG. 27.—SHOWING RELATION OF UTERUS TO UTERINE ARTERIES, URETERS, AND BLADDER. (Greig Smith.)

URETERS.—The surgical anatomy of the ureters has of recent years come to have a special importance to the gynæcologist.* This has resulted from the surgical measures necessitated by the implication of the ureters in affections of the pelvic viscera, and the various operative measures which have been taken by different operators to avoid injury to them, or to repair them when

* See chapter on Ureteral Surgery.

accidentally or unavoidably wounded. Also, the examination of the bladder by endoscopy, and the catheterization of the ureters for diagnostic purposes, demand a correct acquaintance with their position, cystic openings, and relations. The following is Collier's and Morrison Watson's description of the course of the ureters :—

'Entering the pelvis, the ureter crosses the common iliac near its bifurcation, and then runs downwards and forwards in front of the internal iliac and its anterior division. Where this division of the internal iliac splits into its branches, the ureter bends backwards, and is crossed on the inside by the uterine artery. The ureter then turns forward at the level of the internal os, and, at a distance of about half an inch from it, runs along the side of the vagina for a little way, finally bending over it so as to enter the junction between the vagina and bladder. It perforates the latter organ just above the middle of the anterior vaginal wall, and obliquely enters the viscus a little lower down.

Howard Kelly, to whose ingenious method of exploration of the bladder we shall refer again, has added to the knowledge gained by the work of Grünfeld, Newman, Pawlik, Sänger, and Schultze, and I quote here his admirable description of the course of the ureter :—

'The ureters are flattened white cords, about 0·5 cm. in diameter, from 25 to 30 cm. in length, extending from the pelvis of each kidney high up in the loins under the vaulted arch of the thorax down to their embouchure in the urinary bladder. Each ureter is naturally, and for practical purposes, divided into two parts—an abdominal and a pelvic portion—by the bend over the common iliac artery at a plane about 3 cm. above the brim of the superior strait.

'The pelvic portion is not more than 10 or 12 cm. long, while the abdominal portion is from 12 to 15, or more.

'The most inaccessible portion is that nearest the kidney, where it lies concealed by the ribs, from 4 to 4·5 cm. from the median line, and about the same distance posterior to the anterior face of the vertebral column.

'The middle part of the abdominal portion lies from 2·5 to 3 cm. from the median line, on the psoas muscle, on a plane on a level with the anterior faces of the vertebral bodies. The ureter crosses the psoas obliquely to the internal iliac artery at or just above its bifurcation, where it is about 3 cm. from the middle of the promontory of the sacrum. The course is thus obliquely downward and inward, exhibiting a slight inward convexity, and always with marked convexity forward, due to its course over the psoas.

'The ureters lie in the loose cellular tissue back of the peritoneum, and partly under the caput coli and the ascending colon on the right, and descending colon and sigmoid flexure on the left side.

'The abdominal ureter holds no relations to important vessels until joined somewhere about or above the middle of its course by the ovarian vessels, artery, and vein, which cross it to descend into the pelvis along its outer border. At the brim of the pelvis on the right side the ureter lies just behind

the peritoneum, where it can be seen with the ovarian vessels. The peritoneum can be incised at this point, and the ureter thus easily laid bare.

'On the left side the relations of the ureter to the sigmoid flexure and the rectum depend entirely upon the length of the meso-sigmoid and the variable position over the superior strait at which the rectum enters the pelvis. Thus in one case the ureter lies behind the sigmoid veins and arteries, and in another directly behind the intestine.

'After crossing the psoas it crosses the common iliac artery obliquely above its bifurcation, dropping into the pelvis at this point. The pelvic portion of the ureter usually lies at first to the inner side of the internal iliac artery; occasionally it lies to the outside; it is again crossed by the ovarian vein and artery, which leave it at an acute angle just above the brim of the pelvis (the brim as made by the muscle, and not the bony pelvis). The pelvic portion of the ureter descends to the floor of the pelvis in the loose cellular tissue in a

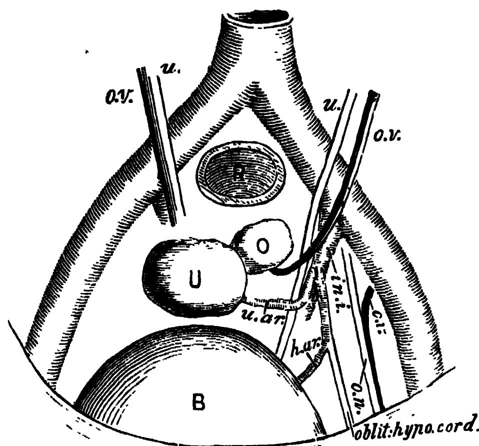


FIG. 28.—PELVIC PORTION OF URETER FROM BELOW. *u.*, ureter; *o.v.*, ovarian vein; R, rectum; O, ovary; U, uterus; B, bladder; *u.ar.*, uterine artery; *o.n.*, ovarian nerve.

forward direction; it passes directly under the uterine artery and the base of the broad ligament, alongside the upper lateral vaginal wall, and finally curves in over the anterior vaginal wall, following its uppermost converging folds, and terminates in the bladder, where the two ureteral orifices are connected by the inter-ureteric ligament.

'The ureter can be palpated through the anterior vaginal wall from its terminus in the bladder up to the point where it passes beneath the broad ligament. It is rolled in the loose cellular tissue under the index-finger, or often better bimanually under two fingers, or in advanced pregnancy on the head of the child like a narrow tape or flattened cord, without hardness. It must not be mistaken in this position for the obturator artery or nerve, or the upper border of the levator ani, or fibres of the obturator muscle, or the rim of the foramen.

'A diseased ureter becomes nodular and thickened, and is peculiarly prone to be mistaken for a cellulitis or an adherent ovary. I have demonstrated this fact on numerous occasions for a number of years.

'A large percentage of cases under treatment to-day for cystitis and for irritable bladder are in reality tender thickened ureters, and an intelligent palpation will detect the tube now hard and cord-like, bringing out the characteristic complaint of intense desire to urinate. One patient in whom I persisted in making the examination was actually forced to urinate on my hand.

'An enlarged ureter can easily be further palpated per rectum behind the broad ligament, and followed from there up over the posterior pelvic wall, as I was also able to demonstrate on a case in the hospital.

'I have found that *the normal ureter can also be traced and minutely examined in the upper part of the pelvic course by introducing a ureteral catheter through the urethra and bladder into the ureter, and carrying it up to or over the brim of the pelvis.* When an inflexible catheter is thus carried over the

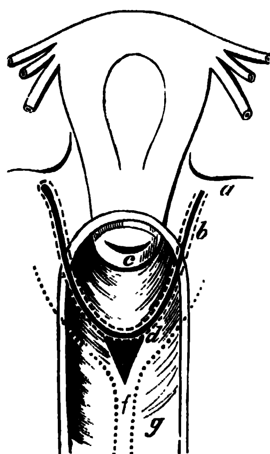


FIG. 29.—DIAGRAMMATIC FIGURE TO SHOW THE PORTION OF THE URETER ACCESSIBLE TO THE EXAMINING FINGER. *a*, Base of round ligament; *b*, ureter and (*d*) intra-ureteral ligament; *c*, trigone; *f*, urethra; *g*, vagina.

brim, the ureter is displaced upward and straightened out. It can now be palpated almost as plainly through the rectum, on the catheter, and any alterations in its calibre noted almost as minutely as when laid bare by dissection.

'At the pelvic brim the ureter can also be felt per rectum.

'It can be felt at the brim less distinctly through the anterior abdominal wall, where it can also be followed for 6 or 8 cm. up toward the kidney, while the catheter remains in place.

'*My landmark for the upper portion of the pelvic ureter is the internal iliac artery, which can readily be felt per rectum.*

'In some cases the artery can be palpated up to the common iliac artery. Close along the inside of this artery the ureter can be felt; if nothing is felt, the conclusion that this portion of the ureter is not enlarged is safe.

'Among the efforts made to locate the abdominal portion of the ureters by surface landmarks, I know none which have thus far proven satisfactory.

'*My own method is to locate the promontory of the sacrum by pressure through the abdominal wall, and from this to locate the point at which the ureter enters the pelvis from* 3 *to* 3½ *cm., outside of, and a little below, the promontory.* By pressing deeply at this point, the fingers at once recognize the pulsations of the common iliac artery, a sign that the correct spot has been found. A large ureter can be felt at this point through thin walls. The patient will always complain of severe pain, and often of a desire to urinate when a sensitive or inflamed ureter is touched.'

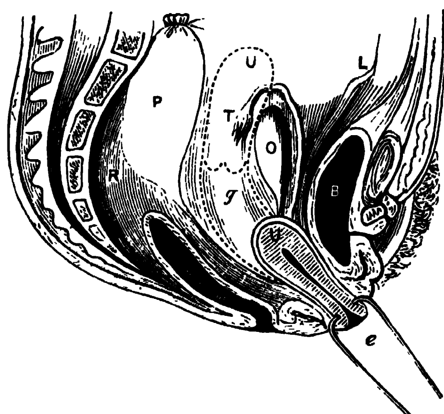


FIG. 30.—SHOWING THE DISTURBED RELATION OF PARTS WHEN THE UTERUS IS DRAWN DOWN. R, rectum; U, uterus; B, bladder; P, peritoneum; T, Fallopian tube; O, ovary. (Greig Smith—after Savage.)

The symptoms due to a stone in the kidney in a young girl I have known attributed to spinal disease, or to some uterine or ovarian affection. Nor does it infrequently occur that such pelvic disease complicates the presence of a renal calculus. The various operations of hysterectomy demand an intimate knowledge of the relation of the bladder and ureters to the uterus and its appendages. I have thought it desirable thus to insist on the advantage it will be to the student in his after-career to take every opportunity of studying all these relationships, and noting any abnormalities of these viscera or in their vascular supply, while prosecuting his anatomical studies.

CHAPTER II.

FIRST STEPS OF EXAMINATION OF A CASE.

As in the case of other organs, that physician is most likely to arrive at a sound basis for his treatment of the uterus who makes his *first* examination a systematic and careful one. Many an error in diagnosis might be saved if we adhered to this rule. One word of caution is needful. While unnecessary examinations of the uterus are, above all things, to be deprecated, on the other hand nothing can be more dangerous to a medical man's reputation than the neglect of making a careful vaginal examination, when he is in doubt as regards the nature of a difficult case, with symptoms clearly pointing to some affection of the pelvic viscera. Want of caution in this respect has brought many a young medical man into disgrace. Take, for example, hæmorrhage, or dysmenorrhœa, the result of undetected uterine polypus; a discharge associated with some pelvic suppurative state; irritability of the bladder, due to a displacement of the womb, to a pelvic hæmatocele, or a uterine fibroid; some difficulty in defæcation, attendant on a tumour, pelvic effusion, or uterine displacement; frequency in making water, due to undetected stone in the bladder; a prolonged back-pain, the result of retroversion of the uterus. The most serious oversight of all is the non-discovery of malignant disease. This I have known to occur on several occasions. There is no retreat from the unpleasant position in which such an oversight places the medical adviser. These are just a few instances of the many cases in which the want of a careful vaginal examination, in the first place, is certain to reflect discredit, through some undiscovered morbid or abnormal condition of bowel, uterus, or bladder.

The appliances necessary to make a *first* examination, in the great majority of cases, are,—

For preliminary examination :—

Bed or couch.	Stethoscope or phonendoscope.
Tape-measure.	Specula.

Speculum forceps.
Uterine sound.
Catheter.
Clinical thermometer.
Absorbent wool.
Oliver's test-papers.
Urinary.

For further examination: —

Bartlett's aspirating needle.
Laminaria sponge-tents.
Uterine dilators.
Uterine hook or tenaculum.
A general anæsthetic.
Cocaine.

The final appeal must be made to the microscope, and the pathological and bacteriological laboratory.

HISTORY OF THE CASE.

I assume a patient consults us for any uterine or ovarian disease, and one requiring a careful examination, and in which an exhaustive differential diagnosis must be made. We first take the history of the case somewhat in this form:—

Age; occupation; married or single; number of pregnancies; number of abortions; date of last pregnancy or miscarriage; if nursing; age at which menstruation began; dates of last three periods; character, quantity, quality, regularity of the flow, and if associated with pain; if there be pain, its nature and seat; discharges, whether inflammatory, leucorrhœal, sanguineous; hereditary tendencies in the family history; state of the bowel; sleep; appetite; exercise (power of walking). It may be well to make a few brief observations on each of the facts thus elicited at our first interview.

Age.—The age of the patient has an important bearing on the diagnosis and management. Take, for example, the time of *puberty*, with its physiological influences, the commencement of the function of ovulation, all the sympathies which are awakened at this period, the sudden bursting into womanhood, the rapid development of the tissues, and the constant demand for renewal on the blood. There is an equally critical period of life, *the menopause*, when the active discharge of the function of ovulation is ceasing, and the child-bearing epoch is about to end. With this second complete alteration in the system, we have local determination of blood at irregular intervals to the various organs, more especially the ovaries and uterus, sometimes culminating in local apoplexies, congestion of the ovaries, menorrhagia, the growth of uterine fibroids or polypus, the commencement of malignant disease.

At this period, also, we are likely to meet with vicarious hæmorrhage from distant organs, epistaxis, hæmatemesis, hæmoptysis. The question of there being any such thing as *vicarious hæmorrhage* has been raised by Wilks (see Robert Barnes's paper, British Gynæcological Society, April, 1886). For my part, I have not the least doubt of its occurrence. I have had several cases in which it was present, as a consequence of suppression of menstruation, or during the commencing irregularity of the catamenia at the menopause. I have seen it in the form of epistaxis, hæmatemesis, and hæmoptysis.

One lady I attended for some years, and whenever the catamenia were suppressed for a few periods, she had violent hæmoptysis, alarming to herself and friends. This quite ceased with the end of the climacteric, and she remained in perfect health for years. The hæmoptysis generally lasted for two or three days, and was always checked by a mixture of gallic acid, matico, ergot and digitalis. Before the hæmorrhage, she suffered from fulness in the head and shortness of breath. She was otherwise a robust woman and in good health.*

Esthiomenic Menstrual Ulcer of the Nose.

In 1896 I had under my care a young lady, aged twenty-six. She was attacked in the spring of 1895 with a small ulcer on the inner side of the cartilage of the nose. This resisted various forms of treatment, assuming a tubercular or lupoid character. At each menstrual epoch redness and pain supervened, the ulcer then becoming very irritable, and ultimately taking the form of a malignant ulcer, with a hard, dark-coloured, and depressed slough, with raised edges and inflamed circumference, threatening the nose with destruction, and involving the lip at each side. The agony the patient suffered at the menstrual period was great. No treatment arrested the extension of the slough save complete extirpation with the knife, and the application of nitric acid or chloride of zinc paste to prevent its recurrence. Seventeen such operations had to be performed before the nose was ultimately cured. Only the slightest deformity, however, remained. The portions removed were several times subjected to bacteriological examination, but nothing definite could be discovered. The ulceration spread from one nostril to another, at one time reducing the skin of the column to the thickness of about two lines, and extending at either side to the lip. There was no doubt of the esthiomenic nature of the ulcer and its malignant tendency, or of its association with menstruation.†

During the climacteric, women may be troubled with various head-troubles, flushings, pain, migraine, and other important disturbances of the nervous system, as convulsions or paralysis.

* See chapter on Menstrual Disorders for remarks on *Pigmentation during Menstruation.*

† A full report of this unique and interesting case will be found in the *Edinburgh Journal of Medical Science,* 1898.

Climacteric insanity manifests itself in taciturnity, melancholia, with or without delusions, and hypochondriasis. The patient has the conviction that she is guilty of some unpardonable sin against her husband or family. Suicidal mimicry may be present, or true suicidal impulses. Such attacks of depression or exaltation may be absent or greatly lessened in the intervals between the menstrual periods, and at these epochs the fits may come on or be accentuated. All such cases during the climacteric require exceptional watching and care. They are typically cases for nursing and supervision in a medical home, and, save in rare instances, they are not to be treated as insane women. A very large proportion recover when the climacteric has passed.

There is the intervening period of active ovulation, during which —*the child-bearing period*—the woman is liable to any of the accidents or results that follow from deviations from the normal physiological act. It is during these years that we have to deal with disorders of menstruation, as amenorrhœa, dysmenorrhœa, menorrhagia, leucorrhœal discharges; ovarian troubles, as ovaritis; ovarian morbid growths, ovarian solid and cystic tumours; uterine congestions, inflammations, growths, alterations in position, flexions and versions, and all the results of these abnormal conditions. More especially if the woman be married, we meet with those affections which are often directly or indirectly connected with the married state: vulvar and vaginal inflammation, uterine discharges, specific sores and gonorrhœa, perinæal laceration, hæmorrhoids, vesical and urethral complications, ectopic gestation, pelvic inflammation and adnexal tumours. Both in the single and married woman, malignant or non-malignant growths are more apt to occur, and in the married the various disorders consequent on lactation.

Pregnancies and Abortions.—The number of pregnancies, with their successive effects on the constitution of the woman and the uterus, is a point of considerable moment. The history of lacerations of the cervix, subinvolution, fistulæ, vesical troubles, mammary growths, should be traced. The relation of fibroids to the pregnant condition may be ascertained. Repeated abortions and miscarriages lead us to suspect either a habit, or the presence of syphilitic taint, as cause. They may explain some accompanying constitutional fault, and arouse our suspicion of latent renal mischief, and on examination of the urine we detect albuminuria or the urine of granular kidney. Inquiry into the possibility of a specific taint is assisted by putting cautious questions concerning the living and

dead children, the dates of the abortions, and the various periods of pregnancy at which they took place. Most important of all contingencies for the practitioner to keep in view is that of ectopic gestation and its consequences.

Occupation and Habits.—This is the most important consideration after the patient's age: whether she leads an active or sedentary life; if she have to stand much, or do a great deal of stooping work; if she sit up late at night, dissipate, or spend a considerable time at the piano, painting, or the sewing-machine; in short, how she generally occupies and amuses herself. This inquiry naturally touches on her daily habits—exercise, clothing, diet, and bathing. We may question her or her friends as to the outdoor exercise taken daily; elicit information on such important matters as tight lacing, tight garters, the manner of suspending the under-clothing, the wearing of flannel, and if the temperature of the extremities be attended to. We learn the nature of her food—if healthful, simple, and nutritious, or trashy and indigestible; the times of meals, and the interval between; the quantity of alcohol and tea consumed. The character of the patient's appetite, the hours of rest, and the amount of sleep are thus arrived at. Not the least important matter to elicit is, the care bestowed on the skin. The resort to a daily bath, suited in its degree of temperature to the temperament of the individual, is perhaps the most healthful custom a woman can adopt.

Every woman should have in her bedroom a sponge-bath. If she cannot take the cold bath, she can regulate the temperature of the water, according to the time of year, from 60° upwards, and have proper sponging of the body, followed by friction with a rough towel. Sea-bathing, again, is most bracing and suitable for many constitutions. It is quite as unfit and hurtful to others. It is well to find out exactly how the sea air and sea-bathing affect individuals before we either permit or recommend it.

Sea air has a special effect on menstruation in some women. I have had several cases in which irregularity occurred as a consequence of change to the seaside and sea-bathing. As a rule, a bracing climate and mountain air are to be preferred in cases of erratic or suppressed catamenia.

*Menstruation.**—With young girls we frequently find a difficulty in coming to any definite conclusions regarding the regularity, the quantity, and the quality of the menstrual flow—all of them equally important facts. At times we are wilfully deceived, and this must

* See preceding chapter for the various views on the function of the ovary and the relation of ovulation to menstruation.

always be remembered in cases in which the least suspicion of pregnancy exists. Here we must place little reliance on assertions, and ascertain, if possible, through a mother or relative, if the patient has menstruated regularly. Mothers are at times careless in watching the occurrence of menstruation; this important duty is left to governesses, schoolmistresses and servants. Hence, not seldom does it happen that a girl is brought for advice for some anæmic or chlorotic state, and the irregularity of menstruation associated with it has passed unnoticed and unchecked. It is necessary, in such instances, that we should insist on a careful watch being kept on the periods and the character of the discharge. If there be suffering with the period, we must learn the time when the pain is most severe; if it precede the flow, and disappear or continue during its occurrence; if there be nervous disturbances, headaches, symptoms of cerebral congestion or hysterical tendencies. Tinnitus aurium or visual aberrations may guide us to an ophthalmoscopic examination, and the discovery of arterial tension, optic neuritis, hyperæmia of the retina, or an error of refraction. Abnormal retinal states will suggest a urinary examination, and possibly the detection of some latent renal disorder. It will be important to date accurately the commencement of any irregularities, whether in diminution or excess; also, if there be menorrhagia, to know whether any slight discharge continues in the intervals between the periods, and its quantity. If the patient has been regular and has ceased to be so, we look for some cause for the first irregularity, as indiscretion in exercise, in dress, in bathing; perhaps in mental shock or emotion, or in climate, or in the period of life.

Discharges.—I shall have occasion more fully to refer to the diagnostic importance of uterine and vaginal discharges in another chapter. I may here briefly allude to the character of the discharge, which has to be ascertained at the first examination. It may be in nature mucoid, purulent, muco-purulent, sebaceous, sanguineous; it is described as creamy, flaky, thick and viscid, gelatinous, transparent, and acid; in colour, grayish, white, yellow, or brown; at times it is tinged with blood, or it may be of an olive-colour; it may have a heavy odour or be extremely fœtid. All these qualities indicate, more or less, the source and nature of the discharge. Our opinion is fortified or verified by a microscopic examination, when the presence of pus and the kind of epithelium, whether squamous or columnar, can be determined.

APPLIANCES NECESSARY FOR DIAGNOSIS.—It is necessary to refer

to the objects gained by the use of the appliances already alluded to as required in a careful diagnosis.

Bed or Couch.—In order to make a correct diagnosis we have to proceed as follows: The patient is either in bed or on a couch. For all gynæcological examinations in the study I prefer the latter. A good examining couch should be constructed so as to raise readily the hips of the patient. The complicated and ingenious mechanisms which are advertised are quite unnecessary. All we require is a couch or table of convenient height and breadth, one over the end of which the buttocks can be conveniently drawn, the thighs

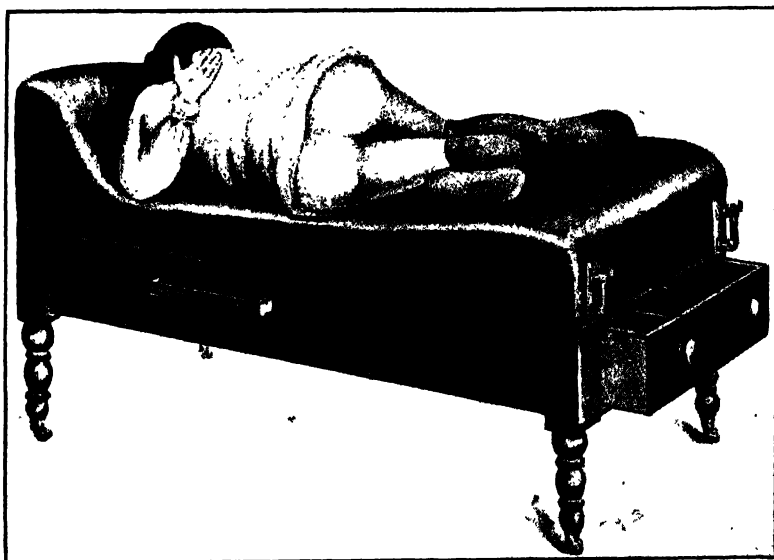


FIG. 31.—AN ORDINARY LIGHT STUDY COUCH, WITH SOCKETS FOR LEG RESTS AND DRAWER FOR APPLIANCES. Patient in Sims' semi-prone position.

supported in rests that are attached to it. In a private consulting room the less obtrusive or conspicuous a couch is the better. For private practice a light couch (see Fig. 31) can be constructed, with a drawer at the end for appliances. It should be conveniently high for the woman to get on to without any difficulty, and for the operator to sit at the side or end of to conduct any necessary manipulations. A light rug or wrap should be at hand to cover the extremities, and the majority of examinations can be conducted with little, if any, exposure of the patient. The couch should have an incline from the foot to the shoulders of

5 inches, and the top can be sloped upwards to nearly the same level as the foot. It is a good plan to have a light stand for appliances, made the same height as the couch, opposite the operator's chair, and another chair at the left-hand side at its head, on which a friend can sit, facing towards the patient's feet. She can thus be cheered and encouraged, while her delicacy is not hurt. It is wonderful how a little gentleness and consideration, with a due regard to a woman's feelings, especially in unmarried girls, will enable us to conduct an examination which any roughness or rudeness would make impossible. We can place a woman on her

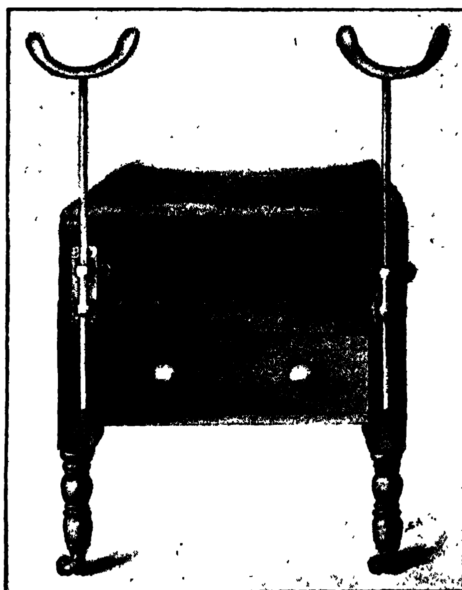


FIG. 32.—END OF STUDY COUCH, WITH THE LEG-RESTS ADJUSTED.

left side, on her back, or in the semi-prone position of Marion Sims. It is impossible to get the last-named posture properly in any ordinary bed, yet it is undoubtedly indispensable in several manipulations of the uterus. For the majority of first examinations, it is sufficient to place the woman on her left side, her thighs drawn up to the abdomen (if in bed, the body should be placed diagonally), with the buttocks brought to the edge and the left arm carried behind the back, the face resting on the pillow. It is best to examine on a hard mattress, and, if required, a few pillows may be placed under the hips to raise them. The couch or table must

be opposite a good light. After a first examination, and when further exploration of the uterus and adnexa is necessary, or the

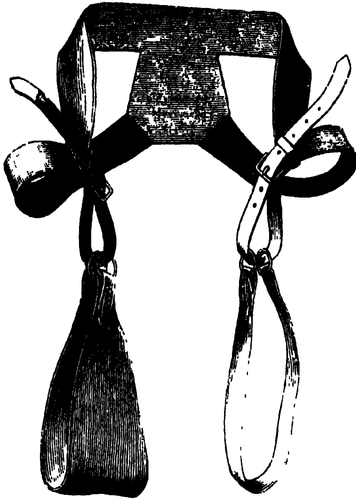


Fig. 33.—Dowd's Jacket and Leg Rest.

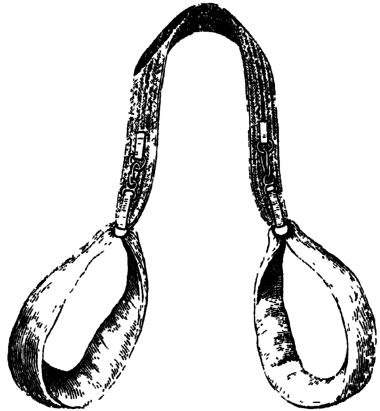


Fig. 34.—Howard Kelly's Leg Support.*

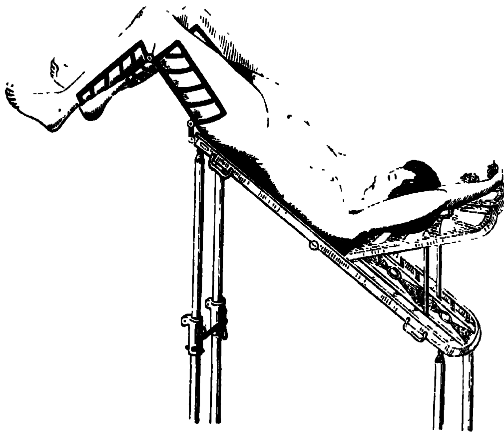


Fig. 35.—Light Portable Table for Trendelenburg Position.

duckbill speculum is employed, the dorsal position is by far the best. The bimanual examination is absolutely necessary in every thorough exploration of the uterus and pelvic viscera when a complete

* I very commonly use a modification of Howard Kelly's leg supports, and find it answers every purpose.



FIG. 36.—PORTABLE AND FOLDING TABLE OF DOLÉRIS, MADE BY MATHIEU. (Pozzi.)

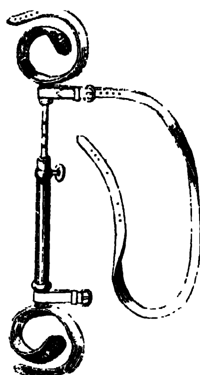


FIG. 37.—CRUTCH OF VON OTT (St. Petersburg). The long strap fixes patient to the couch or table.

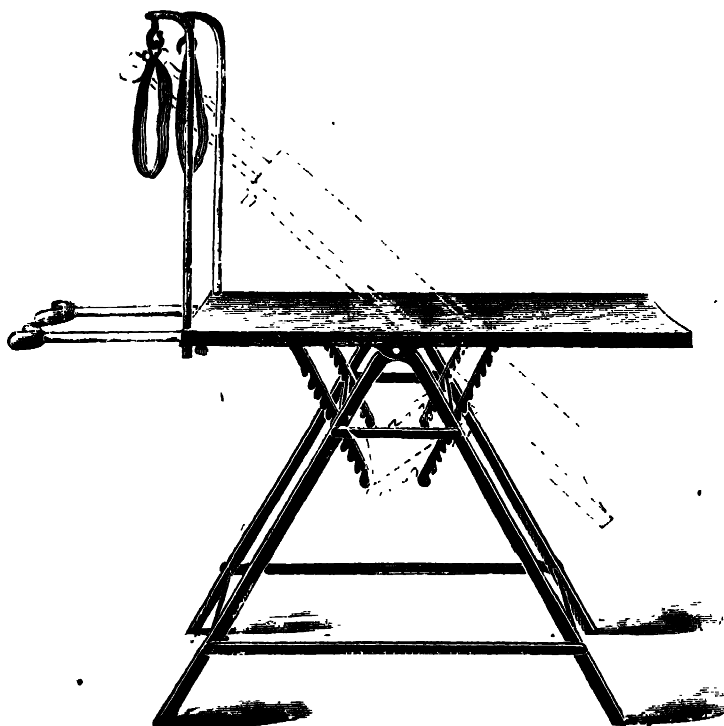


FIG. 38.—LIGHT PORTABLE METAL TABLE, SUITABLE FOR TRENDELENBERG'S POSITION. (Arnold.)

diagnosis of a tumour, whether of the uterus or adnexa, has to be made. By its means alone can we satisfactorily determine the size, mobility, and relation of the uterus. By this method we have more complete command over the adnexa, and can best judge of alterations in their size, of adhesions, of the character of enlargements both of the uterus and adnexa. It is the examination

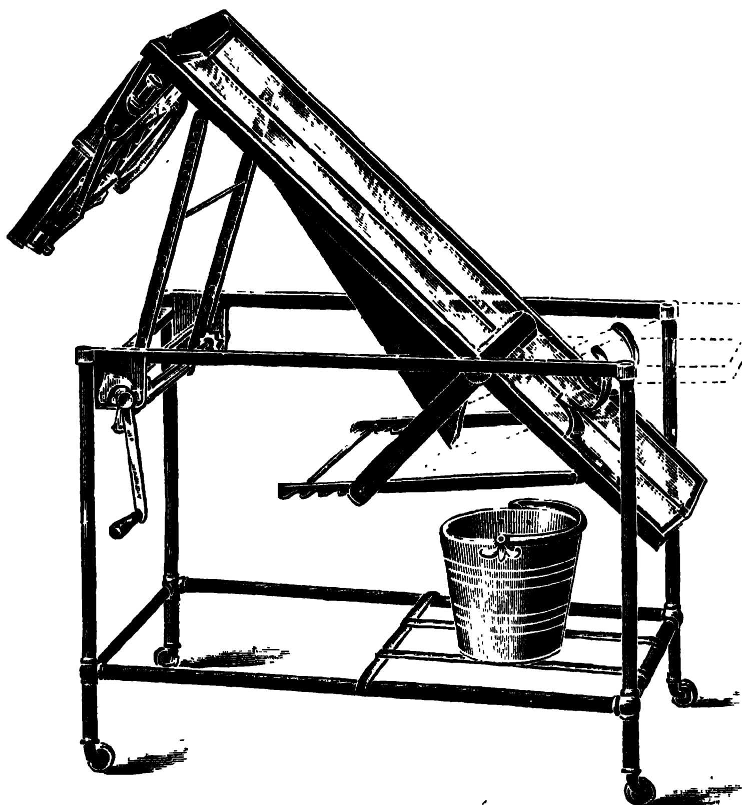


Fig. 39.—Excellent Operating Table, Nickel and Glass, suitable for all Abdominal Operations.* (Arnold.)

to make when the patient is under an anæsthetic. When we determine to adopt the semi-prone position we do so thus: Any square table about 4 feet by 2 feet 6 inches, having a blanket smoothly spread on it, answers the purpose admirably. The patient lying down on this surface, on her left side, with the body

* I have several times operated upon this table and the one shown on p. 59, and can recommend them.

placed diagonally, the buttocks well to the side, has the thighs drawn up; the left arm is next taken, and the back of the left

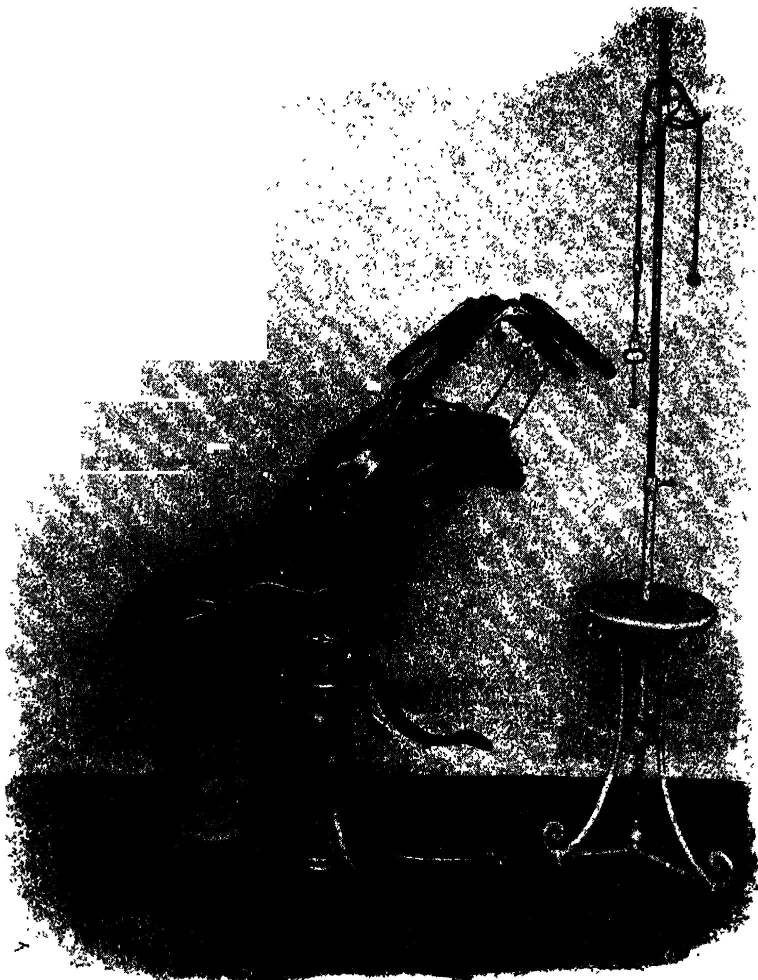


FIG. 40.—TABLE OF DOYEN IN THE EXTREME POSITION OF TRENDELENBERG, SHOWING ELEVATOR FOR UTERINE MYOMATA.*

hand is laid on her left scapula. The right hand is now let hang

* This table of Doyen's is one of the most complete I have ever seen; it can be easily raised or lowered by the foot by working the lever.

over the side of the couch, while the face is, when possible, partly turned towards the operator. Thus the sternum and chest are brought well on to the plane surface. At times we may not be able to accomplish this, but we thus secure the most favourable depression of the sternum. An assistant or nurse to hold the speculum steady and in position—a little art in itself—is required.* I have only to remind young practitioners how careful they must be in taking every precaution to protect themselves from unjust aspersions, by having always at hand, and, when necessary, present in the consulting room, some female attendant or friend of the patient.



FIG. 41.—PATIENT ON THE TABLE OF DOYEN IN THE COMPLETE TRENDELENBERG'S POSITION.

Attendant in Study.—So many serious charges have of late been made against medical men, that I deem it right to emphasize the caution given in the text, so that the practitioner may put it out of the power of any designing or hysterical woman to bring a charge of criminal assault against him by taking such precautions as will make this impossible. Also, in those equally serious

* For ordinary use in an examination under an anæsthetic Howard Kelly's leg-rest is most convenient.

cases in which women, more often those of the better classes, come for the purpose of securing abortion, the medical man cannot be too cautious. Women are most importunate and pertinacious in their endeavours to effect this purpose. A medical man may be made the victim of a plot to throw the blame off the shoulders of another. A woman may wilfully deceive him as to the occurrence of the catamenia or of hæmorrhage, and the impossibility of conception. A false charge of effecting criminal abortion may be the consequence, and if the practitioner be not wary and determined, appearances and circumstances may be urged against him that he could never have anticipated. Circumspection and caution to a degree that may seem almost unnecessary are demanded in order to defeat either hysterical delusion or deliberate intrigue. The obligations of professional honour and fair play impose on all practitioners the need for the greatest care and reticence in listening to any such stories,

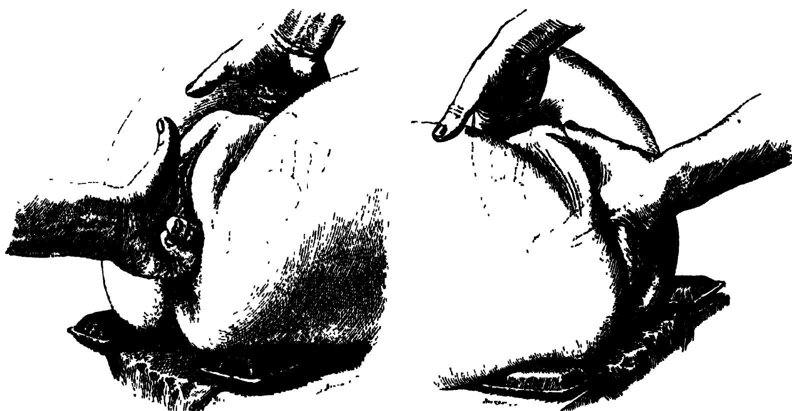


FIG. 42.—BIMANUAL EXAMINATION, FROM HOWARD KELLY, SHOWING THE DIFFERENT POSITIONS OF THE HANDS AND FINGERS.

when whispered of a brother professional. It is to be regretted that many such unfortunate cases would not occur but for the too ready ear of some medical man, who, either designedly or through incaution, has countenanced a groundless suspicion, or favoured a charge absolutely ruinous to the character of him against whom it is made. Such precautions are all the more necessary in these days, when women generally are so conversant with medical matters, and read the details of these cases in the daily press, or gather their information from medical literature, to which they have too free access. *In every case in which the practitioner has the least suspicion as to the object of a woman's visit, or when she makes any illegal request, he should take a note in writing of her name, residence, time of coming to and leaving his room, the data on which he formed the opinion he gave, the advice that accompanied this opinion, and of any prescription he may have written.*

The Tape-measure is useful for abdominal measurements. We now require to take the circumference at the umbilicus, and the lateral measurements from the spinal column to the umbilicus, and

from the umbilicus to the anterior superior iliac spine at either side; also from the anterior superior iliac spine to the symphysis. We thus estimate the amount of abdominal distension, and the size of a tumour, or the relative difference and degree of inequality between either side. Take for example the following case, in which I was consulted for an affection of the hip-joint.

Fibromyoma with an Anomalous Tumour of Ovary causing Lameness and Symptoms of Hip-joint Affection.

The plate (I.) shows a solid ovarian tumour of an anomalous nature removed at the same time as a large fibro-myoma. The patient was sent for examination in consequence of an obscure affection of the left hip; there had been constant pain and swelling of the left thigh, with difficulty in walking. The

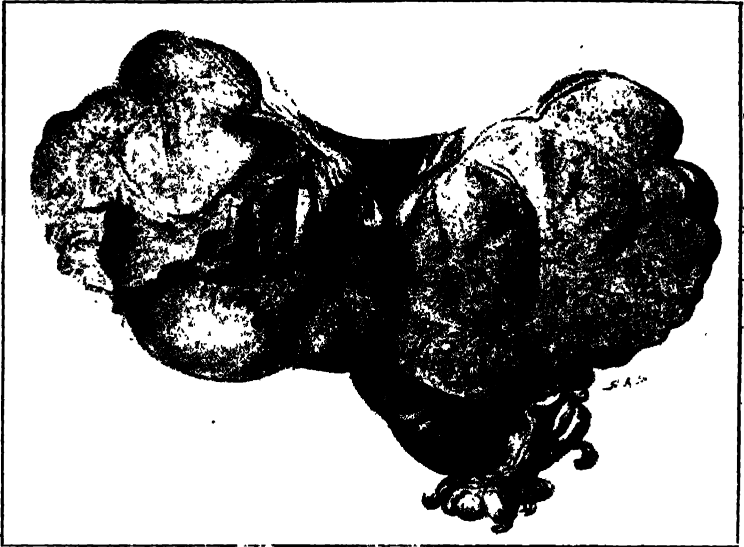


FIG. 43.—MICROSCOPICAL APPEARANCES OF THE ANOMALOUS OVARIAN TUMOUR ILLUSTRATED IN PLATE III.

catamenia had been regular. There was no hæmorrhage. I determined that her symptoms were due to the pressure from the tumour. Intraperitoneal hysterectomy was performed on February 2, 1897.

The multiple fibromatous ovarian mass was then discovered on the left

PLATE III



FIBRO-ADENOMA OF THE OVARY OCCURRING WITH A FIBROMYOMATOUS UTERUS: Supra-Vaginal Salpingo-Oöphorectomy recovery. (Author.)



TO SHOW LOBULATED EXTERNAL SURFACE OF THE TUMOUR.

[*To face p.* 64.

PLATE IV.



FIBROMYOMATOUS UTERUS REMOVED FROM SAME PATIENT AS FROM WHOM THE OVARY (PLATE III.) WAS TAKEN (Author.)

[*To face p.* 65.

side. It was larger than an orange. This was jammed downwards and to the left side. The patient made a perfect recovery. The microscopical report of the committee of the Obstetrical Society was as follows: 'The tumour (part involved in the growth) consists chiefly of well-developed fibrous tissue arranged in intersecting bundles—sections taken from different parts show, in addition, numerous widely distributed well-defined spaces fitted with epithelial cells. These spaces are irregularly oval or elongated, occasionally branching, and there is no lumen. There is no sign of invasion of the surrounding fibrous tissue by the epithelial cells, and no small-celled infiltration. The stroma surrounding some of the spaces is dense and hyaline in appearance.' The decision arrived at was that the tumour was not malignant, and that in the arrangement of the epithelium it most nearly resembled that met with in some forms of adeno-fibroma of the breast.

The Stethoscope is required for the differential diagnosis of pregnancy from ovarian dropsy, ascites, fibrocyst and fibroid tumours of the uterus, phantom pregnancy, and other causes of abdominal enlargement. The fœtal pulsation and placental souffle should be most carefully listened for. It is also required for pulsating tumours of the abdomen, and in the diagnosis of these from aneurismal enlargement of the vessels.

I have used the phonendoscope very largely in abdominal cases, and can strongly recommend it.

The Speculum is not necessary in those cases where our object is to diagnose the character of a tumour, or the nature of some pelvic swelling or uterine enlargement. When the affection is a uterine or vaginal inflammatory one, acute or chronic, its use is called for. In virgins its employment is to be avoided whenever possible. Never should it be taken in the hand for introduction, in such cases, unless its assistance be indispensable for diagnosis or treatment.

The impression made on a patient by our first examination may secure her future confidence. Gentleness of manipulation must be cultivated, and especially in the use of any speculum. It is best to begin with a smaller-sized conical one. I prefer that with the rounded and bevelled end, as it does not hurt in the same way as those with a sharper edge.* The short bivalve speculum of Barnes is a useful instrument. It completely exposes the infra-vaginal cervix. Fergusson's glass speculum (Fig. 51), of which we require three or four sizes, is generally made too long. The uterine

* Vulcanite specula are easily disinfected, and cannot be broken. The disadvantage of these specula is that the edges are rather sharp, and hurt in introduction; also, they do not reflect the light well.

end should not be sloped at too great an angle. It throws a good light on the os uteri, and is useful for topical applications. It can now be had of toughened glass. A fenestrated speculum is not, as a rule, of any special service. The duck-bill speculum (Figs. 44 and 49) or Neugebaur's (Fig. 50) variety of it, is used in the semi-prone or lithotomy positions. It is indispensable to the gynæcologist in manipulations on the os uteri and cervix. In fact, in all cases in which it is possible to employ the duck-bill speculum it is better

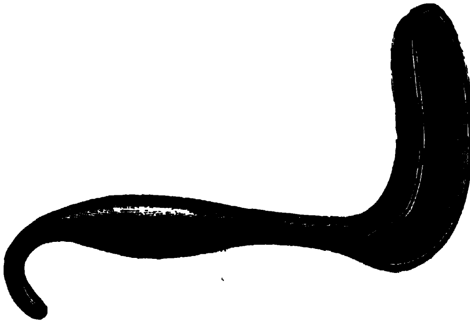


FIG. 44.—METAL VULCANITE-COVERED DUCK-BILL SPECULUM.



FIG. 45.—VULCANITE COATED SPECULUM AND DRESSING FORCEPS. Most useful in vaginal operations in which antiseptics are employed, and in post-operative dressings. (Messrs. Arnold & Sons provide all these vulcanite coated instruments.)

to do so. Specula must be kept scrupulously clean, not alone for the sake of better illumination, but also to avoid the risk of any contagion in the examination of several cases with the same instrument. Metal duck-bill specula are made by Leiter (Vienna) coated with vulcanite; these can be thrown into mercuric chloride solution without detriment. It is well to place all specula in some disinfectant fluid after they have been used, and before they are finally washed with very hot water. To apply a tubular speculum: place

the patient on her back, or on her left side, in the position before described. The speculum is first well anointed with oil or vaseline,



FIG. 46.—TAPERING SPECULUM, WITH THE BEVELLED END SO CUSHIONED INTERNALLY AS TO PREVENT THE CONCEALMENT OF ANY SECRETION.*

then taken in the right hand: if the lateral position be chosen, the right buttock is raised with the palm of the left hand, and the fingers of the same hand are used to separate the labia. The speculum, with the long lip posteriorly, is now pressed gently, but steadily, through the vulvar orifice (and here we may cheer the patient and encourage her to bear the slight pain of introduction). It is now pushed onwards, in a direction upwards and backwards, *bearing well on the perinæum*, until we reach the posterior cul-de-sac of the vagina, and get the cervix well into the instrument. At times this is not easy; the uterus may be considerably anteverted or retroverted. A little practice and experience will enable us, with the uterine sound, to direct the os uteri forwards or backwards so as to bring it into sight. By rotating the speculum, withdrawing it a little and re-introducing it, we can generally obtain a complete view of the

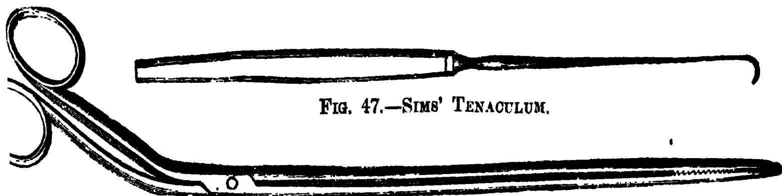


FIG. 47.—SIMS' TENACULUM.

FIG. 48.—RECTANGULAR SPECULUM FORCEPS.

circumference of the cervix and the os uteri. The line of meeting of the vaginal walls seen through the instrument should be kept in

* It is made of light metal, highly polished, for the Author. It can be had in three sizes. It must not taper too much. I have a full-sized *non-tapering* speculum of this kind, made for use in multipara.

the centre of the surface exposed to view. If we place the woman on her back, we insert the speculum in the lateral position, and press it well back on the perinæum in passing it into the vagina. In this preferable method the os uteri generally comes into view readily,



FIG. 49.—SIMS' DUCK-BILL SPECULUM.*

and the patient can herself often give valuable assistance in supporting the speculum, if we happen not to have an assistant. The speculum forceps (Fig. 48) is required with the speculum, and some pledgets of absorbent cotton-wool ready at hand, to wipe the

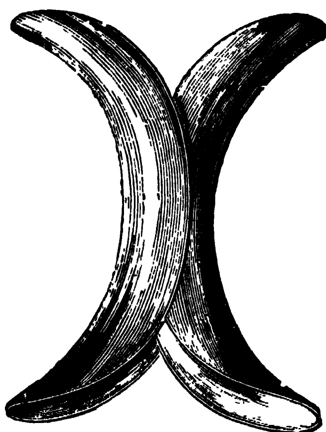


FIG. 50.—NEUGEBAUR'S SPECULUM.

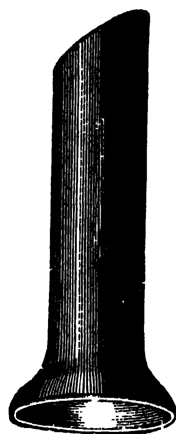


FIG. 51.—FERGUSSON'S SPECULUM.

surface of the os uteri, and to clear the vaginal roof of any discharge that may have accumulated or be pressed out by the speculum. It is well to have a few uterine cotton-holders if we require to wipe out from the interior of the cervix any discharge with cotton-wool; also

* The blades of the speculum should not be too deeply grooved, nor too long; those ordinarily made frequently are. Every practitioner should have two sizes of the duck-bill speculum.

an ordinary sponge-holder. To use the duck-bill speculum in the semi-prone position of Marion Sims, an assistant stands at the back of the patient and places the left hand flat on the right gluteal fold,



FIG. 52.—AUTHOR'S TUBULAR SPECULUM SLICE. Useful in irrigation of the Vagina.

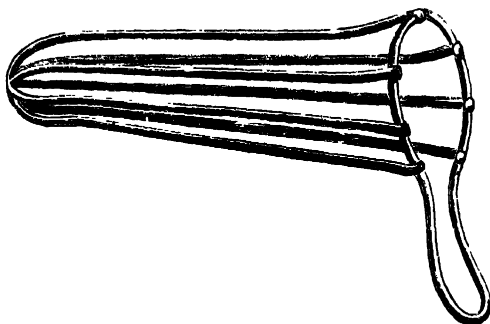


FIG. 53.—BATH SPECULUM.

holding it well up ; the blade of the speculum is now introduced in rather an oblique manner to the orifice, the labia being gently

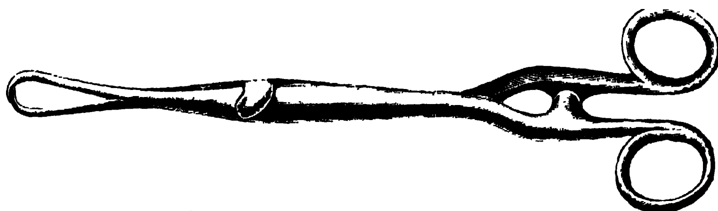


FIG. 54.—SINGLE TENTACULUM FORCEPS.

separated ; and while it is pushed upwards and backwards it is rotated on its axis, and the back of the speculum is brought against the perinæum. It is then carried into position, directed by the

Speculum with Electric Illumination.—Various specula fitted with the electric light have been devised. Furst has devised a self-retaining speculum, to which a self-retaining electric light is attached. They can be obtained of any medical electrician. There is a good deal of the electric toy in these specula.

finger. It will be found that more room is obtained, and the uterus is better seen and more readily controlled, in the dorsal position. Once the speculum is properly adjusted, and the cervix uteri is brought well in front of the blade, the finger of the right hand, or the handle of the sound, must be carried up to the anterior vaginal wall, which is thus held out of the way. The uterus is generally, by this method, well exposed to view. If we require to bring it down for medication, or to steady it for topical application, we use a Sims' uterine hook, or, what I prefer, a slender double tenaculum forceps. It is fixed in the anterior lip of the uterus, and the os uteri is thus drawn into view. Neugebaur's speculum, a modification of Sims', has in some instances the advantage, through its double blade, that it enables the operator to draw up the anterior vaginal wall. When applied it acts like a bivalve speculum, and is to an extent self-retaining. The posterior blade having been adjusted, the anterior is slipped within it, and is so guided into position. The vaginal roof is thus stretched, and a good view of the uterus is obtained. There are other modifications of Neugebaur's speculum which it is not necessary to refer to.

Demonstrating Vaginal Speculum of the Author.—The desirability of having such a speculum as would enable the surgeon to demonstrate to a student, at the bedside, the os uteri and infra-vaginal cervix, without exposure of the patient, often struck me in hospital work. By such an appliance as that shown in Fig. 55, this can be perfectly achieved. It consists of a

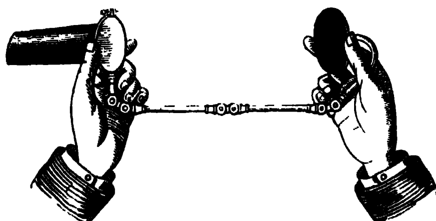


FIG. 55.—DEMONSTRATION SPECULUM OF AUTHOR.

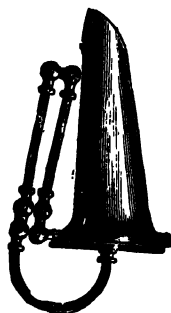


FIG. 56.—APPLIANCE FOLDED (½ size.)

nickel-plated steel bracket with three joints, as shown in the figure, which are so constructed as to enable the mirror to be placed at any angle or plane to the orifice of the speculum, from which it is 25 centimetres distant. A clamped ring with a groove receives the mouth of the speculum, and will fit one of large size. This may be so arranged that any ring can be applied so as to embrace a smaller speculum. At the other end of the bracket is a

mirror, which works in a universal joint. It is 3 inches in diameter. If it be wished to get a magnified image, a slightly concave mirror can be attached. The entire appliance is shown folded in Fig. 56. It is quite portable.

By means of this instrument the lips of the os uteri can be seen, either by sunlight or artificial light, at a distance of several feet, without exposure of the patient.

The Uterine Sound (Figs. 57–59) takes the place of a long obstetric finger. The more the practitioner's experience is enlarged

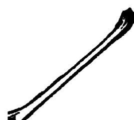


FIG. 57.—SIMPSON'S SOUND.

by careful digital examinations of the vagina, uterus, and the adnexa, the less he will feel the need for the sound. Most con-



FIG. 58.—SIMS' PLIABLE PROBE.

ditions can be accurately and satisfactorily ascertained without it. The bimanual method, aided, if need be, by the recto-vaginal,



FIG. 59.—AUTHOR'S SMALL PORTABLE SOUND, WITH CENTRAL SCREW.

carried out in *both* the dorsal and semi-prone positions, seldom leaves us in doubt as to the size, and mobility, and hardness of the uterus,

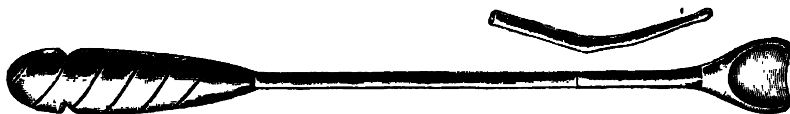


FIG. 60.—AUTHOR'S COMBINATION OF ELEVATOR AND SOUND.*

* The cupped ivory end screws on to the silver shank. The handle is of aluminium. It is grooved and notched so that it can be covered with a layer of cotton wool if used through the rectum in the retroversion of pregnancy. It makes an admirable and well-balanced sound. (Messrs. Arnold.)

the state of the adnexa, and condition of the cervix and os. A good uterine sound should be pliable and smooth, and if graduated it is better to have the scale on the concave side. It can be made portable for the pocket, either by a screw joint in the centre, or the upper half of the instrument may screw into a case which acts as a handle. It should not be too heavy. The sound is used both for diagnostic and therapeutical purposes; in diagnosis, to ascertain the length of the uterine cavity and the patency of the canal, the mobility of the uterus and its position in the pelvis; it is used in utero-rectal and recto-vesical examinations, as in the diagnosis of hæmatocele, polypus, and inversion of the uterus.


FIG. 61.—FIRST STAGE OF PASSING THE SOUND. (Hart and Barbour.)

The principal therapeutical purpose of the sound is in versions and flexions, to take the place of a repositor. To introduce it into the uterus, we proceed thus:—

The patient is placed in the lateral or semi-prone position. The thighs are well drawn up, while the nates are brought over the edge of the couch. The instrument is taken lightly by the handle in the left hand, while the point of the fore-finger of the right hand is carried up to the os uteri, which is felt, and its direction and the position of the uterus fairly ascertained. The sound is now introduced into the vagina, with the concavity towards the perinæum and the handle directed backwards; it is next guided along the index-finger of the right hand to the os uteri. As a rule, with some little manipulation it enters the cavity of the cervix; it is then carried along the cervical canal, and now the handle is turned in the operator's hand, and by a *tour de maître* is brought round with a gentle sweep, until it is directed towards the perinæum, so

as to have the concavity now facing anteriorly, and thus the instrument is directed into the uterine axis in its normal and slightly anteverted position. It is now carried onwards, passing over the forefinger of the right hand, still held in position, until it reaches the fundus uteri. This we judge it to have done by the slight sense of resistance we feel to the onward passage. We should not make the woman's sense of pain a test. In certain softened states of the uterine tissues it would be possible to penetrate the uterine wall and still cause very little pain.

The usual difficulties experienced in passing the sound are caused by contraction, or stenosis of the canal of the isthmus uteri, or flexions, or versions. There may be such a degree of narrowing that it is impossible to pass the instrument, or we may only succeed with the pliable silver uterine probe of Sims. In versions we must carry the handle well back to the perinæum, or forwards to the pubes, according as we have an anteversion or a retroversion to deal with; if there be also a flexion, we may have to bend the sound, and endeavour, by giving it the necessary curve, to glide it over the bend. We pass the sound into the bladder in recto-vesical and urethro-vaginal methods of examination. We must always remember the *sine quâ non* of obstetric practice—that *before taking the uterine sound into our hand for any therapeutical or diagnostic purposes, we exclude the possibility of pregnancy.** Also, it is well, after all tedious examinations with it, if these be made at the operator's house, to take every precaution against cold; and the simplest plan to prevent this is to place a dry plug of absorbent wool in the vagina, to be withdrawn by the patient herself after a few hours. In this, as in



FIG. 62.—SECOND STAGE OF PASSING SOUND. (Hart and Barbour.)

* See remarks on the *differential diagnosis of pregnancy.*

a number of other trifling uterine operations, the immunity from all harm that may have followed us for years may be suddenly and unpleasantly interrupted when we least expect it—the attack of uterine colic or of endometritis, or perimetritis, is suddenly developed, and alarming symptoms may occur that a little prudent forethought would have prevented. Take, for example, the neglect of the safe maxim, to refrain from the use of the sound immediately before a menstrual period is approaching.



Fig. 63.—Sound in Utero; Recto-uterine Examination.

By keeping the forefinger of the right hand at the os uteri, and placing its tip on the concave surface of the sound when it has penetrated to its full extent, we can estimate, by the graduated grooves, the exact length of the uterine canal. Before removing it we can test the mobility of the uterus, raise it, or replace it in position; and also judge comparatively, by utero-rectal, utero-abdominal, and utero-vaginal examination, of any abnormal

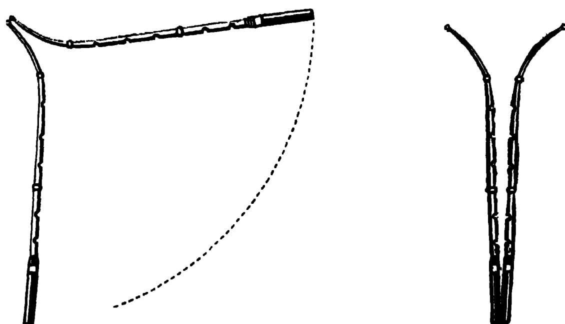


Fig. 64.—Proper Method of Rotation of the Sound, as compared with the Improper. (Hart and Barbour.)

connection of the uterus with some neighbouring viscus, or attachments that have formed between it and other morbid pelvic and abdominal formations and growths. In introducing the sound it may be caught and arrested by some fold of mucous membrane, or the knob (which should always be of fair size) may enter a small follicular cul-de-sac. By partly withdrawing, and gently passing it on again, we get over the obstruction. Again, at the isthmus we may find its passage impeded. One golden rule must be observed—never use force. Better to withdraw the knob of the sound from the uterus, and with the finger in the vagina give the point of it a new curve, bending it a little more forwards or backwards, or laterally, and again try to slip it into the cavity of the fundus. Frequently, in extreme cases of anteflexion or retroflection, we shall succeed in passing it by thus repeatedly altering its shape and changing the direction of the handle, until we hit off that which enables it to pass through the altered curve of the uterine canal.

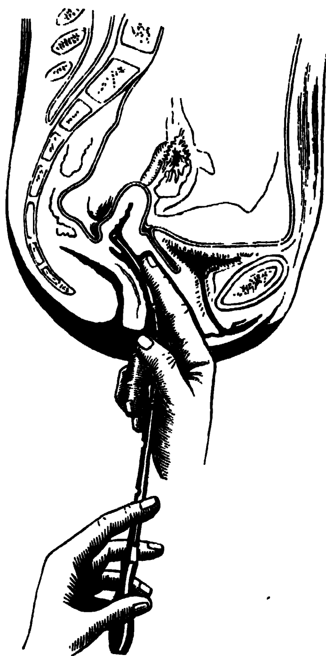


FIG. 65.—SOUND ARRESTED BEFORE ROTATION IN CASE OF ANTEFLEXION. (Hart and Barbour.)

In extreme retroversion we may have to carry the handle forwards to the pubes, and direct the concavity backwards;* we next feel for the os uteri, and pass the sound onwards, giving the handle such elevation or dip as will assist the knob to pass on into the cavity. When the elbow of the sound is reached, by a semicircular sweep, we revolve the sound on its axis and thus alter its direction, while at the same time, by lowering the handle, we raise the uterus from its depressed position (Fig. 65).

The Urine.—An examination of the urine is often required, and, indeed, few cases of any complicated local affection can be viewed satisfactorily, either from a diagnostic or prognostic aspect, unless a urinary examination be made.

* See chapter on Retroversion.

In Oliver's test-papers we have very delicate tests for albumen; and the examination may be carried out at the bedside, all we require being a small test-tube. I have found the potassio-mercuric-iodide the most delicate of these papers, detecting albumen where heat and nitric acid have failed. The indigo-carmine papers are equally reliable for sugar.

This table of comparative analyses of male and female urine by Becquerel may be useful as a guide in judging of abnormal urine:—

COMPARATIVE ANALYSES OF MALE AND FEMALE URINE (BECQUEREL).*

	Mean Composition of Four Healthy Men.	Mean Composition of Four Healthy Women.	General Mean.
Specific gravity	1018·9	1015·12	1017
Percentage of water . . .	96·88	97·50	97·19
" " solids . . .	3·11	2·49	2·80
" " urea . . .	1·38	1·03	1·21
" " uric acid . .	0·039	0·040	0·039
" " other organic matter	0·92	0·80	0·86
" " chlorine (combined, fixed) . . .	—	—	0·05
" " phosphoric acid .	—	—	0·03
" " potash . . .	—	—	0·13
" " soda, lime, and magnesia . . .	—	—	0·39

We proceed in practice thus—

Take a specimen of the urine. Find its specific gravity at 60°, reaction with litmus, and the quantity passed in the 24 hours.

Albumen—sp. gr. 1006 to 1010. Test by Oliver's potassio-mercuric-iodide papers (I find it necessary, in order to avoid error, always to apply heat after a precipitate is obtained with Oliver's paper); heat 180°, and nitric acid a few drops—precipitate; Pavy's citric acid and ferro-cyanide pellet. Heller's test—small quantity of urine and cold nitric acid allowed to run down the side of the test-tube.

Phosphates—sp. gr. increased slightly; heat 180°, precipitate obtained, which nitric acid dissolves; phosphatic crystals under microscope.

Urates and uric acid—sp. gr. 1025 to 1030; heat dissolves; hexagonal or rhomboidal crystals of urea, with nitric acid; also uric acid crystals under microscope.

* 'Urinary Analyses.'

Sugar—sp. gr. 1030 to 1050. Johnson's picric acid test; indigo-carmine test of Oliver; Trommer's and Fehling's tests; Pavy's pellets afford a ready, convenient, and reliable test for sugar (directions accompany).

Pus—Coagulates with heat; deposit forms homogeneous layer at bottom of glass; becomes gelatinous with liquid potassæ; mixes with the urine; pus corpuscles under microscope.

Mucus—Deposit often glairy, tenacious; urine generally alkaline; is not miscible with urine; rendered less dense by liquor potassæ; acetic acid gives a sort of membrane floating in the urine.

Blood—Discoloration with heat; formation of coagulum; blood corpuscles under microscope. Almen's test—freshly prepared tincture of guaiacum and ozonized ether—blue colour.

PROPORTION OF URINARY CONSTITUENTS IN NORMAL URINE.*

	FOR ADULT MAN.	FOR ADULT WOMAN.
Total quantity in 24 hours .	1400–1600	1200–1400.
,, of urea . .	35 grammes	30 grammes.
Percentage of urea . . .	2·35 %	2·3 %
Total quantity of uric acid . .	1 gramme	0·857 grammes.
Percentage of uric acid † . .	0·066 %	0·066 %.
Ratio of uric acid to urea, 1 : 35.		
Total quantity of chlorine .	7·5 grammes	6·75 grammes.
Percentage of chlorine ‡ . .	0·5 %	0·52 %.
Expressed as sodium chloride .	3·6 grammes per oz.	3·8 grammes per oz.
Total quantity of phosphoric acid	3·16 grammes	2·8 grammes.
Percentage of phosphoric acid .	0·21%	0·22 %.

Clinical Thermometer.—It may seem superfluous to refer to the value of an accurate record of temperature in arriving at a diagnosis, and conducting the management of a case. The importance of such a record is made more obvious if we reflect for a moment on the causes of nightly exacerbations of temperature, or a daily elevation of a few degrees above the normal standard. In peritonitis, pelvic, hæmatocele, metritis, suppurating cysts, acute vaginitis; in chronic peritonitis; in uræmic and septicæmic states, and cystitis, we may expect the characteristic rise and fall in the temperature range. In pelvic effusion, especially if pus be forming, the nightly exacerbation is the rule.

* This is the standard proportion on which the Clinical Research Association analyses are estimated. I am indebted to the Director for this table.

† Somewhat high—corresponds with recent and more accurate analyses.

‡ According to Parkes—rather high.

With the previous history of a case, an accurately kept chart of the temperature will materially assist a physician in forming a correct diagnosis.

An Anæsthetic is absolutely necessary to enable us to arrive at a correct diagnosis in certain cases of uterine and adnexal tumours, in the differentiation of pelvic from abdominal tumours when we require complete relaxation of the abdominal wall; also when there is a suspicion of phantom pregnancy, and when there is great sensitiveness of the parts, rendering an examination without it extremely difficult, if not impossible. All the usual precautions to be observed with regard to anæsthetics should be taken. For this particular purpose I consider chloramyl (chloroform with ℥ ii. of nitrite of amyl to the drachm) a capital anæsthetic. It should be administered with a Junker's apparatus. I used this inhaler for years. I saw at Schauta's *klinik* a large number of administrations of a mixture of chloroform (1 part), æther petrolei (1 part), and sulphuric ether (2 parts).*

For ordinary *gynæcological* operations I prefer nitrous oxide gas and ether—given with Clover's apparatus. The choice of an anæsthetic should properly lie with the operator. He has the main responsibility in the conduct of the case, and presumably is the best judge of the nature of the anæsthetic suited for the character of the operation, its duration, and the consequences of the after-effects.

The A.C.E. mixture—alcohol, sp. gr. 0·838, 1 pt.; chloroform, sp. gr. 1·497, 2 pts.; ether, sp. gr. 0·735, 3 pts.—may be given in a Clover's inhaler or cone. I do not personally care for this combination. I much prefer the pure vapour as more certain and equable. The administration of oxygen gas in certain prolonged cases is, I consider, a great addition to the practice of anæsthetization.

Dudley Buxton says with regard to the use of oxygen:—

'The uses of oxygen in anæsthesia are prophylactic and restorative. It prevents the onset of various undesirable complications, and presents one of the most powerful agents we possess to counteract grave respiratory dangers under anæsthetics. Paul Bert suggested a mixture of oxygen and nitrous oxide, but as he found it unsatisfactory when given under normal pressure, he adopted the practice of exhibiting this combination of gases under increased pressure.† The method, although successful, fell into

* This is an admirable anæsthetic mixture. It is difficult to get the petroleum ether good.

† See 'Anesthésie Chirurgicale,' M. Rottenstein, p. 303.

desuetude owing to the cumbersome apparatus required. More recently Klikowitsch and Hillischer, of Vienna, have shown that a most satisfactory anæsthesia can be obtained at normal pressure with a mixture of from 10 to 15 per cent. of oxygen and nitrous oxide. Hewitt, in this country, has devised a satisfactory apparatus, and has confirmed Hillischer's views on the value of his so-called "schlafgas." The combination has in my hands proved most valuable for delicate children, anæmic persons, and those in whom shutting off the oxygen supply leads rapidly to cyanosis and pulmonary engorgement. Carter Cole * has suggested the use of a special apparatus for giving ether with oxygen, and publishes a series of satisfactory cases. I have, however, without the use of any special inhaler other than my form of Clover's gas and ether apparatus, employed this method with the greatest success. By this means many cases, which would have been most difficult or impossible for the use of ether, have been anæsthetized without let or hindrance. Oxygen employed with chloroform to lessen the liability to asphyxia under the anæsthetic has been in use for very many years. Neudörfer, the originator of the method, states that less chloroform is used, and that there are fewer severe after-effects. The plan, although recently written about and claimed as an "invention," is as old as the introduction of chloroform itself. Kreutzmann has used the mixture, allowing the afferent tube of the Junker's inhaler to be connected with a reservoir of oxygen. Personally, I have found oxygen a valuable addition to the chloroformist's armamentarium. In poisoning by chloroform, the performance of tracheotomy or laryngotomy when practicable, and the continuous introduction of a stream of oxygen through a tube inserted into the windpipe, with rapid rhythmic compression of the lower ribs, succeeds better than any other method I know.'

Some safe rules in the administration of anæsthetics are frequently violated in practice: (1) The operator should not, if possible, be the anæsthetizer; (2) the administrator should not be conversed with

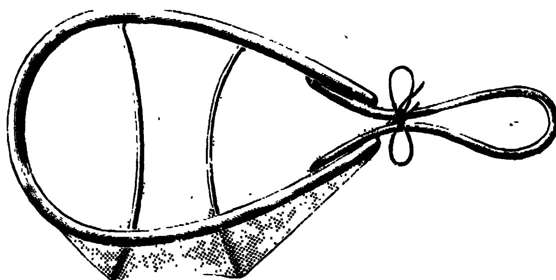


FIG. 66.—CHLOROFORM CAP.†

during the administration of an anæsthetic; (3) the operator and those assisting him should be careful to make no observation on the case while the patient is in the condition of semi-anæsthesia, either

* *Med. Rec.*, New York, Oct. 12, 1895. † See p. 80.

when she is being placed under the anæsthetic or is coming round.



Fig. 67.—Junker's Inhaler.

I am doubtful, after a very large personal experience in the administration of various kinds of anæsthetics, whether, taking the *after* effects of ether into consideration, there is much material advantage in its use over that of chloroform in abdominal surgery. I was one of the first in the United Kingdom who strongly advocated the employment of ether in general surgery.* At that time I had myself administered methylene some 1,300 times without accident, and chloroform also frequently. Of late years, however, I seldom ask for chloroform, and nearly all my abdominal operative work is done with ether.

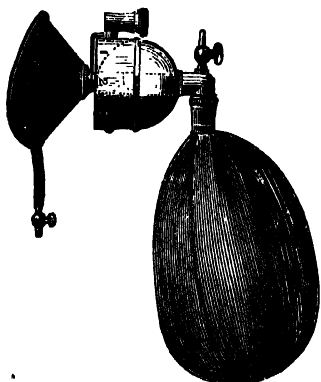


Fig. 68.—Clover's Gas and Ether Inhaler.†

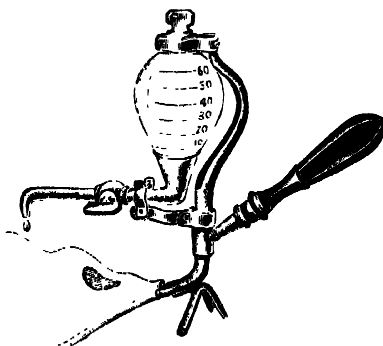


Fig. 69.—Chloroform Cap, Graduated Bottle, and Tap.

* 'Responsibility in the Choice of Anæsthetics:' Macnaughton-Jones (H. K. Lewis, London, 1874); 'Report on Anæsthetics,' *Dublin Journal of Medical Science*, 1879.

† As used in Doyen's clinic.

A few precautions must be observed with all anæsthetics. Examine the heart and lungs before using any anæsthetic. Have the patient lying down, and the stomach comparatively empty—a little brandy given shortly before administration is often of advantage; let the temperature of the room be over 50°; let the

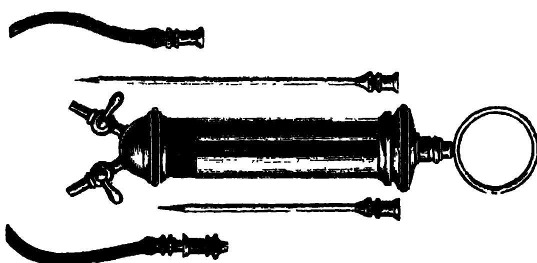


FIG. 70.—BARTLETT'S ASPIRATOR, MOST USEFUL IN EXPLORATION.

body be free, and all tight clothing loosened; also see that the patient does not wear artificial teeth; watch *the breathing* and the countenance carefully all through the administration; be warned of danger by failure in the pulse, and the signs either of cerebral anæmia in the face, or of asphyxia. At once, if alarming

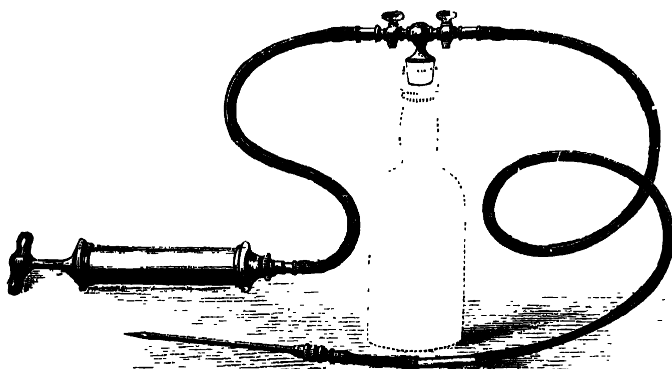


FIG. 71.—ASPIRATOR. (Matthews Brothers.) This is a most handy and simple appliance, and, together with the set of guarded needles and obturators furnished with it, answers every purpose.

symptoms occur, cease administration, and use restorative measures; raise the patient's jaw, and thus the hyoid bone, by pulling the lower maxilla upwards and forwards, placing the thumbs behind the ramus at either side; the body should be inverted after Nélaton's method; galvanism may be applied along the course of

the pneumogastric or over the heart, and sulphuric ether injected subcutaneously.

Howard, of New York, advocates the complete extension of the head and neck, as the best means of raising the epiglottis and hyoid bone. He maintains that this plan is much more efficient than elevation of the jaw; also, he contends that traction of the tongue does not raise the epiglottis. Bringing the head over the edge of the table or bed, so that it may swing quite free, he carries it firmly backwards and downwards, by placing one hand under the chin and the other on the vertex. The utmost possible extension of the head and neck is thus maintained. The skin is to be made quite tense.

I have spoken of the examination of the heart before the administration of an anæsthetic. Of course, it is well known that the most experienced anæsthetists daily administer ether, chloroform, and nitrous oxide, without taking this precaution. I do not think that is an example to be followed by the ordinary practitioner, or by any one whose opinion may not have sufficient

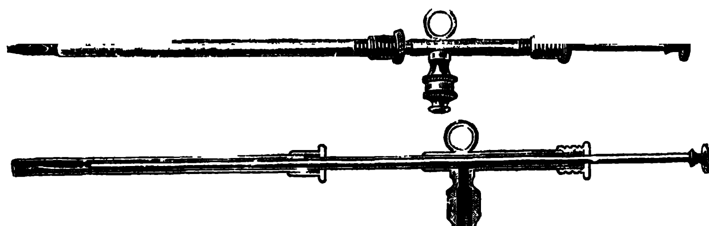


FIG. 72.—ASPIRATING NEEDLE.

weight with an ignorant jury. If the anæsthetist be a specialist or an authority, and consider such an examination a matter of form or superfluous, in the event of a fatal issue he can better set himself right before a coroner's court than one who has not gained such a reputation.

An Aspirating Needle or subcutaneous syringe is often required to remove a little of the fluid in abdominal and pelvic tumours, in order to ascertain its nature by chemical and microscopical examination. We may draw the fluid from the point of greatest distention—either vagina, rectum, or abdomen. The small exploring aspirator of Bartlett will be found very useful in the exploration of small cysts, and for purposes of diagnosis.

Cocaine.—Local anæsthesia of the external genitals and vagina may be effected by the use of cocaine, either in the form of ointment (10·20 per cent.) or solution. The ointment may be freely smeared over the part or applied on a piece of cotton-wool.

In the case of a sensitive vulvar orifice, cocaine may be used for the purpose of examination, but this is rarely necessary. It is useful in some minor operations on the vulva, and may be applied for any painful operation to the external surface of the cervix. I have performed a variety of minor operations with the electro



FIG. 73.—BENGUÉ'S BOTTLE FOR LOCAL ANÆSTHESIA, WITH CHLORIDE OF ETHYL.

cautery on the outlet painlessly under cocaine. Lanolated lard is the best basis if we use it as an ointment (lanoline ℥ss., lard ʒii., rosewater ʒi.).

Tents are employed for exploration of the uterine canal, as in cases where we suspect polypus of the uterus, retention of portion



FIG. 74.—TUPELO TENT.

of the membranes after abortion, and in menorrhagia, when we are uncertain of the cause of the discharge. Their employment in certain operative procedures I shall have occasion to refer to.

Tents used in this country are of three kinds—sponge, sea tangle or laminaria, and tupelo-root (*Nyssa multiflora*). There



FIG. 75.—SPONGE TENT.

are certain dangers that may follow from any kind of tent: uterine colic, collapse, metritis, peritonitis, parametritis, tetanus, septicæmia. I have twice seen an alarming condition supervene within three hours after the introduction of a single laminaria tent into the uterus — agonizing pain, symptoms of collapse, fainting, etc. Laminaria tents, if left in too long at first, are apt to break, and

their extraction, save by enlargement of the cervical canal, has proved a matter of difficulty. Sponge-tents I rarely use in strictly gynæcological work. I would limit their employment altogether to obstetric cases. For tupelo it is claimed that it is cleaner to use, not so apt to break, is more uniform in its gradual enlargement in the uterus, and easier of removal; its power of absorption is greater, and hence its action is more rapid. I have constantly employed it, but of late years only use laminaria.

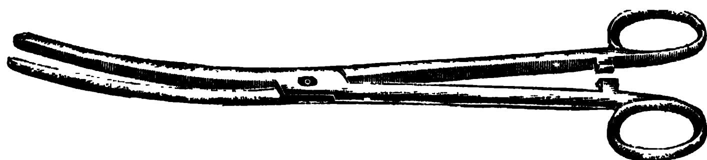


Fig. 76.—Forceps for introducing Tents. Any long forceps will answer. When the uterus is drawn down with the hook or vulsellum the tent can be introduced with the hand.

Two special rules should be adhered to in the use of tents. Do not insert them *immediately* before a menstrual period, nor leave them in longer than from six to twelve hours (sponge-tents not over six hours), and never for this length of time without visiting the patient. On no pretext leave a patient for a night, or a day, with a tent in utero without assistance being within reach if required. Bromide of ammonium (20–30 grains) or bromide of potassium should be given at night when dilating with a tent. Let the patient

Fig. 77.—Natural Size of the Smaller Laminaria Tents I use, taken out of Iodoform and Ether. They are easily bent to any curve we require. (See chapter on Asepsis.)

lie in bed when the tent has been inserted. Force should not be used in the introduction of tents, and great care be taken *when there is any history of recent perimetritis, or in patients prone to peritoneal inflammations.* At all times an intelligent attendant should be left with the case after a tent is placed in utero. Anticipate any septic consequences, so far as is possible, by the use of antiseptic tents (see chapter on Asepsis, etc., for the preparation of laminaria tents),

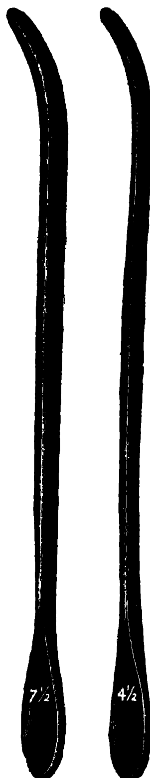


Fig. 78.—Light Vulcanite Dilators of Leiter. These are admirable, and can be kept in any antiseptic solution.

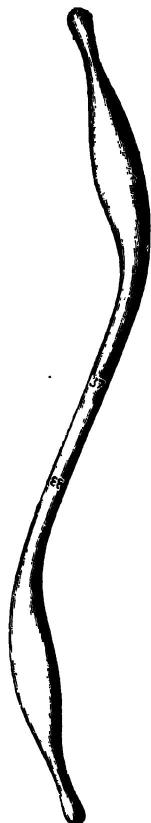


Fig. 79.—Author's Graduated Bulbous Aluminium Bougies. The ends are of different sizes.

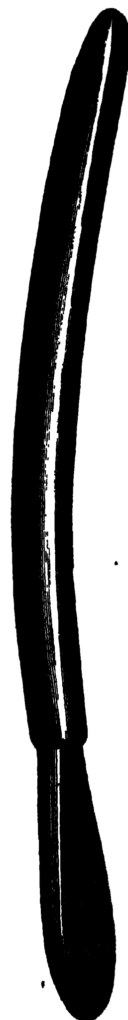


Fig. 80.—Hegar's Dilator.

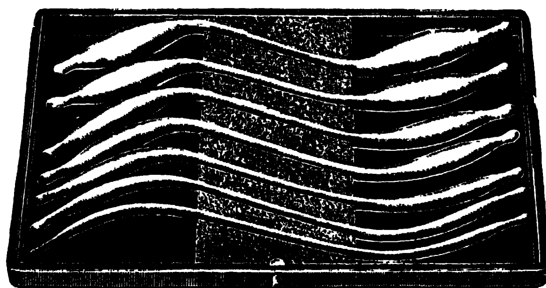


Fig. 81.—Case of seven Bougies. 24 sizes graduated in millimetres.

taken from a solution of iodoform and ether. To introduce a tent we place the patient in the dorsal position (having taken all the preliminary precautions for rendering the vagina aseptic). The uterus is steadied with a hook or tenaculum; and the tent, slightly curved, is introduced with a long forceps. If any difficulty be experienced, the uterus should be drawn well down and fixed with the tenaculum, so as to obtain steady control over it.

Forcible Dilatation may be carried out by any of the different forms of dilators which have been devised for this purpose. In Hegar's (Kumerlé, Freiburg) dilators the size of each is marked on the short handle of the bougie. It is simply catheterization of the canal by short ebonite bougies. I have had specially made for the same purpose, and find they answer much better, solid conical metal bougies of pliable pewter, varying in their longest circumference from 11 millimetres to 59; but they may with benefit be two sizes larger than this last diameter. They have a bulbous point, with a short neck, which gradually expands into a belly. The curve of the bougie is a circle, having a diameter of 25 centimetres. In using these bougies it is well to have the patient in the dorsal position and drawn well down to the edge of the table. The metal can always be kept smooth and bright, and, when oiled, slips with slight force through the cervical canal. If the uterine canal be partially dilated by tent previously, the requisite degree of full dilatation can afterwards be easily obtained with a suitable metal or vulcanite dilator. There is no risk of any 'disastrous consequences' unless rash, unwarrantable force be employed.

Expanding and Irrigating Dilators.—Several varieties of expanding and irrigating dilators, rarely if ever used by any experienced gynæcologists, have been devised with considerable ingenuity, as in the case of curettes. In previous editions I have figured several of these. They are absolutely unnecessary, and are more ornamental than useful, the dilators and methods of dilatation described being quite sufficient for every purpose.

CHAPTER III.

FIRST STEPS OF EXAMINATION OF A CASE (continued).

MODE OF EXAMINATION.—I now assume that such a pelvic, ovarian, or uterine case as pelvic hæmatocele, ovarian or adnexal tumour, or fibrocyst of the uterus, is brought for examination. Let us proceed to exhaust the means at our disposal, so as to arrive at a correct diagnosis. Before exposing the abdomen, we have taken the previous history, satisfied ourselves as to the character of the menstrual secretion, and inquired into the action of bowel and kidney; we have examined the temperature and pulse. We judge of the woman's countenance — if cheerful and hopeful, or expressive of pain and anxious; if emaciated or cachectic; if characterized by the *facies ovariana* of ovarian disease. There is in ovarian dropsy a strange mingling of facial emaciation with anxiety of the countenance, often out of all proportion to the interruption of the general health; it is altogether different to the countenance of pregnancy, and quite distinct from the cachexia of ordinary malignant disease. This appearance, however, we must remember, is influenced by complications, such as phthisis, hepatic or renal disease, pregnancy, or malignant disease of the ovary. But in hepatic and renal disease, we have other evidence —such as anasarca, icterus, distended abdominal veins, œdema of the face, hands, or feet, albuminuria, and perhaps cardiac complication—to indicate the cause of the distension. We now proceed to examine the abdomen. I cannot insist too emphatically on the care with which we should explore it before we proceed to any internal examination.

Examination of Abdomen.

Its Shape.—We notice if it be barrel-shaped and arched, as in ovarian dropsy, or if the swelling be unilateral or uniform; if the sides bulge, more or less, as in ascites, or if the tumour be evidently central, and if its ratio of increase have been regularly progressive,

as in pregnancy; if there be distinct swellings in different regions, and the surface of the abdomen be irregular in outline, as in multilocular cysts, malignant solid growths, or tumours of the liver and spleen.

The Umbilicus.—Examine if it be prominent, as in pregnancy; bulging and watery-looking, as in ascites; drawn in, as in solid tumours with adhesions, and in malignant cases.

The Appearance of the Skin.—If tense and thin, showing the prominent recti muscles underneath; or œdematous, with a characteristic watery appearance; if it be laden with fat; if marked with lineæ albicantes, cracks, scars, maculæ, or any cutaneous eruption.

Measurements.—In ovarian dropsy the greatest circular measurement is at the umbilicus (more likely it is below it in ascites). Take lateral measurements to determine the symmetrical nature of the growth. During the early months of growth of an ovarian cyst these are asymmetrical; they are symmetrical in pregnancy.

Palpation.—Nothing save experience in educating the finger to differentiate the various forms of tumours, solid and fluid, and any enlargements of the abdominal and pelvic viscera, can teach abdominal palpation. It is not to be learned by any verbal description. The size of an organ, the extent of an enlargement, the degree of hardness or softness, the character and extent of fluctuation, the nature and direction of the pain caused by pressure, the appearance of the fluctuating wave, and the sensation of superficiality or depth conveyed to the hand when testing the abdomen for this sign—all have to be kept in mind in palpation. A few directions may, however, be of service. Have the patient's head and shoulders supported with a pillow; let the surface of the abdomen from the sternum to the pubes be exposed; stand facing the patient, and lay the palms of the hands lightly on the abdominal wall; gradually pass the hands over the various abdominal regions, hypochondriac, epigastric, lumbar, umbilical, inguinal, and hypogastric. With the fingers explore these spaces carefully; watch the patient's countenance for indications of shrinking or pain; define as far as possible the limits of any growth, the region it occupies, its connection with surrounding viscera, if fixed or movable, if hard or nodular, if soft or fluctuating; get the character of the fluctuation, if superficial or deep-seated. Now lay the hand on one side of the abdomen, and tap lightly with the fingers on the opposite side, and feel the nature of the transmitted wave; judge, by watching its movement under the skin, of its depth (deeper wave in ovarian

dropsy), and, by its freedom of motion in all directions, of the character of the cyst in which it is confined, unilocular or multilocular, and if the fluid itself be encysted, circumscribed, or free.

It is quite possible in a very fat patient to mistake the 'fat-thrill' for fluctuation. 'To muffle this,' says Goodell, 'I ask one of my assistants to lay the ulnar edge of his hand along the linea alba. The pressure of the hand will act exactly like the damper-wedge of the piano-tuner, which muffles the sound of one string while its fellow is being tuned. By this means I get the wave-tap of a fluid, and am enabled unhesitatingly to say that there is a liquid collection in the abdominal cavity.' Thus a fat abdominal wall may completely obscure the diagnostic aid we obtain from our sense of touch, and has doubtless led to many of the errors of practice, recorded and unrecorded, in the operative interference with abdominal enlargement.

Percussion.—We require to distinguish the relative degrees of dulness or resonance in the different regions, above the umbilicus, below it, and in either flank, and the influence of posture on the percussion note. The rule is, that ascitic fluid falls with gravity (if the fluid be free in the peritoneal cavity, and not restrained by adhesion) into the most dependent position, which is in the sitting position the lower zone of the abdomen, and in the recumbent posture the flanks. Hence these regions will give a dull note.

In ovarian dropsy, on the other hand, the cyst rising up from the pelvis is in front of the intestines, which are displaced to either side, so that the anterior surface of the abdominal wall yields a dull sound and the flanks are resonant. Nor, as a rule, is the dulness changeable with posture, and never to the same extent as in complicated ascites. The complication of pregnancy with ascites or hydramnios, of ovarian dropsy with pregnancy, ascites, or cysts of the liver or kidney, all of which we occasionally find, compel us to be very cautious in placing reliance on percussion in diagnosis. The abdomen must be most cautiously examined for the different conditions likely to be confounded with pregnancy. It requires occasionally most patient and careful listening to detect the fœtal heart-sounds, especially if there be a rather fat abdomen, any ascitic fluid in the peritoneum, or hydramnios, and if the fœtal pulsations be weak and rapid. We have to be careful not to fall into an error that I have known occur with regard to a patient with a very rapid pulse, who suffered from an abdominal tumour which proved to be fibroid. The rapid aortic pulsations were transmitted to the tumour,

and an opinion was consequently formed that the woman was pregnant. We must guard ourselves against the possibility of error, in cases of assumed pregnancy, by the use of an anæsthetic in the determination of a doubtful case, and to exclude the presence of a phantom tumour.

Digital Examination.—We now proceed to make a vaginal examination. The patient may be laid on her side, or, better, on her back, as I have previously described. The nail of the examining finger should always be pared close. We then anoint the latter with boracic vaseline or lard, and carry it gently into the vaginal canal. Before doing so, on separating the labia, it may be well to inspect the vulva for any swelling, excoriation, discharge, sores, or tumours, and at the same time mark the appearance of the clitoris, urethral orifice, hymen (if present), fourchette, and note the temperature of the vagina. Having reached the uterus, we examine the condition of the os uteri, its shape and size, if normal, or abraded, soft, patulous, or fissured. The cervix uteri is next examined, as to its position, shape, length, and degree of hardness. Placing the finger firmly on the cervix, we estimate by pressure the mobility of the uterus. At the same time we contrast the anterior and posterior wall of the cervix, examine for any sulcus in the uterus, any special hardness in the uterine wall, or any fibroid which may here be developing. The finger is now swept, commencing anteriorly, round the vaginal roof, and any fulness, contraction, hardness, or swelling is detected and examined. The degree of tightness or stretching of the vaginal roof is estimated. We next pass to the posterior aspect of the uterus, and explore the utero-rectal space and the pouch of Douglas. In this latter space we may find a tumour, ovarian cyst, a fæcal accumulation, some cellular and peritoneal effusion, the fundus of a retroverted uterus, or a prolapsed ovary. We take advantage of the act of respiration and the influence of the diaphragm on the pelvic viscera, by directing the patient during this examination to draw a few deep inspirations, followed by prolonged expirations. This will help to bring the ovary more within reach of the finger. In many cases, by directing the woman to lie towards the opposite side to that of the ovary we wish to examine, and by passing the forefinger (that of the right hand for the left ovary) up to the vaginal roof, while with the fingers of the other hand we firmly depress the abdominal wall into the pelvis, we can get the ovary between the fingers and define its limits and also trace the Fallopian tube for its entire extent. While thus examining, we do

not forget the possible presence of stone in the bladder, which may be detected through the vaginal wall in front. Before withdrawing the finger we satisfy ourselves thoroughly as to the character of recent effusions, the size of the ovaries, or if the remains of any old effusion occupy the cellular tissue, or be inside the peritoneum.

Conjoined Examination.—This we carry out either by the two hands or by the sound and hand.

By the hands	Abdomino-vaginal. Recto-abdominal. Recto-vaginal.
By the sound and hand	Utero-abdominal. Utero-rectal. Recto-vesical.

Abdomino-vaginal.—We want to ascertain the size of the uterus, its degree of mobility, its sensitiveness; the condition of the bladder ovaries, and broad ligaments. We do this in the most satisfactory manner by placing the fingers of the right hand on the abdominal wall above the pubes, and the index-finger of the left in the vagina, resting on the cervix (behind it if the uterus be retroverted), thus getting the organ between the two hands in the manner shown in the diagram. In every case of obscure uterine affection, when we wish to know accurately the volume of the uterus and its relative increase in size, this is an indispensable step in our examination. We cannot too strongly urge the importance of this method of examination in palpating the ovaries. As Howard Kelly says: 'The invagination of the pelvic floor is of the utmost importance, as by this means the examining finger is practically lengthened by the amount of the invagination, or, what is the same thing, the vagina is shortened.' * The patient having been anæsthetized and drawn well to the edge of the couch, with the thighs held apart by the assistant or nurse, or supported in leg-rests, such an examination cannot fail to reveal the true state of the uterus and

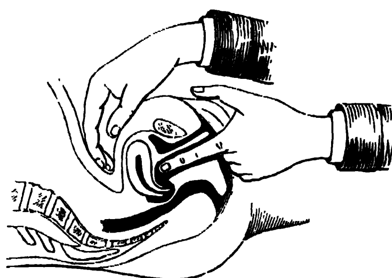


Fig. 82.—Abdomino-vaginal Examination. (Schroeder.)

* See p. 63, Fig. 42.

adnexa. Sometimes we can reach higher up in the pelvis, and gain more complete information by the introduction of both the fore and middle fingers.

Recto-abdominal.—Withdrawing the finger from the vagina and again anointing the surface, we pass it gently into the rectum. In doing so, we reach, unless the uterus be retroverted, the cervix uteri, and feel it prominent through the anterior wall of the rectum. *Depressing the uterus well* with the fingers on the abdomen, we now reach the ovaries, which can again be explored, and their size and sensitiveness ascertained. We may also satisfy ourselves of the volume and position of the uterus, of the dimensions of a fibroid or a retrohæmatocele; while we likewise judge of the degree of congestion of the rectal mucous membrane, and the extent to which the rectum is interfered with either by cellular effusions, collections of fluid, tumours in Douglas' space, or a retroverted uterus.

Recto-vaginal.—Still keeping the finger in the rectum, we insert the index-finger of the other hand into the vagina, or, if we prefer it, we may withdraw the index-finger and introduce the middle finger into the rectum, while we explore the vaginal wall with the index-finger of the same hand. Examination of the rectum often gives such distress to the patient, that the less frequently we introduce the finger into it the better. Therefore, I generally prefer to use the index-finger of the right hand in the vagina, the woman lying on her back, the left forefinger remaining in the rectum. We can thus in the very best manner determine the state of the rectum, the utero-rectal space, the position and size of the ovaries, and the character of any tumour, swelling, or effusion between the uterus and rectum.

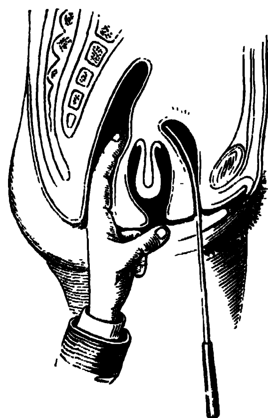


FIG. 83.—RECTO-VESICAL EXAMINATION IN COMPLETE INVERSION OF THE UTERUS.

Recto-vesical.—If there be any doubt which the use of the uterine sound may remove, we may now slip it into the bladder while we retain the finger in the rectum. We thus are enabled to judge of the position and size of the uterus in fat women, in whom palpation is difficult, of the presence of the uterus in atresia of the vagina, of its absence in inversion, and to diagnose between inversion and polypus. While the sound is in the bladder, if there be vesical

irritation we may explore its cavity, judging of its capacity and how far it is encroached on by the uterus, while we exclude the existence of stone.

Utero-abdominal.—Having passed the sound into the uterus and judged of its sensitiveness, position, and mobility, and the length of the uterine cavity, or the presence of any obstruction, we place the right hand over the pubes and manipulate the uterus on the sound. In diagnosing the relations of abdominal tumours, their connection with the uterus, and the extent to which the uterus is involved by fibroid growths, or polypus, the utero-abdominal method will occasionally be found to give valuable assistance.

Utero-rectal.—Still retaining the sound in the uterus and passing the finger into the rectum, we can in a similar manner examine the posterior wall of the uterus, judge of the intramural fibroids, any adhesions posteriorly, the degree of retroversion, how far the uterus is fixed by any effusion, and to what extent its freedom of movement is limited.

Other Steps.—In a large proportion of cases the examination just detailed, in part or whole, will enable us to arrive at a conclusion as to the nature of a case. It may, however, happen that doubt still remains. There is some discharge from the uterus, and we have to satisfy ourselves as to its source and nature. On examination with the finger, the feeling of the os uteri and cervix prompts us to use the speculum. An abdominal tumour exists, regarding the exact nature of which, or its contents, we are not perfectly satisfied. There is a quantity of abdominal fat or tympanitic distension of the abdomen, or the difficulty of making a satisfactory examination of the patient has been great. This difficulty may also result from nervousness, or sensitiveness and tenderness of the vagina.

Speculum.—In the case of discharge, we have to use the speculum to examine the os uteri, and judge of the source and nature of the discharge. Also it may be requisite to see the vaginal walls; if they be stripped of epithelium, or granular and secreting a quantity of vaginal mucus. A beginner may have some difficulty in passing the sound in the usual manner into the uterus. By placing the patient in the semi-prone position and using Sims' speculum, he can generally do so with ease. Or if she lie on her back, and a tubular speculum be inserted, he can bring the os uteri into view; and then, if the uterus be in its normal position or anteverted, by dipping the sound well down, he can, unless there be some obstruction, pass it on into the cavity.

Tents.—A tent or uterine dilator may have to be employed, if we desire to explore the uterine canal in cases of suspicious and prolonged hæmorrhage, when we suspect intra-uterine or placental polypi, or where there is septic discharge, the consequence of any intra-uterine decomposition.

Aspiration.—We may draw off a small quantity of fluid from a doubtful abdominal swelling, to determine its nature by chemical or microscopical tests; this may be done with the ordinary hypodermic syringe or aspirating needle. The aspirator is specially useful for diagnosis in doubtful pelvic and uterine enlargements, such as retro-hæmatocele, cystic tumours in Douglas' space, pelvic peritonitis, and retained menses.

I have already said that the more experienced our tactile sense becomes, the less we require to use either sound or aspirator, or even the speculum, in diagnosis. Careful digital examination, aided by palpation, and by taking advantage of posture, is generally sufficient to enable us to come to a correct conclusion. But in all cases of doubt and difficulty it is better to exhaust the means of examination than to commit an error in diagnosis. To no aid in examination does this remark apply more than to the use of an anæsthetic. We do not avail ourselves as often as we should of anæsthesia in the elucidation of difficult questions arising in connection with complicated and obscure abdominal cases. It is not too much to say that in any such no final verdict should be given without its help.

It is in those cases in which difficulties arise, either from the quantity of fat in the abdominal cavity or gaseous distension in the bowel, where there is great pain and sensitiveness on the least attempt at examination, or when a patient is debilitated or weakened by previous prolonged suffering, that an anæsthetic is specially called for. In children and young girls an anæsthetic is often essential in order to make a thorough examination. Cocaine may be used, but I prefer, for complete examination, when any anæsthetic is required, either ether or chloroform. I feel confident that many errors of diagnosis would be avoided if we more frequently had resort to anæsthetics in examination of the abdomen and pelvis.

Rectal Exploration (Simon's Method).—This plan of exploration of the abdominal viscera is seldom practised in this country. In the instance of a mesenteric mass causing partial ascites and abdominal enlargement, I was enabled, by rectal palpation of the pelvic viscera, to arrive at a diagnosis. The woman should be fully anæsthetized. She is placed in the lithotomy position, her thighs are well drawn up to the abdomen; the sphincter ani is then thoroughly dilated by

the fingers, or, better, by the thumbs; gradually the hand, well oiled, in the form of a cone, is most cautiously introduced in a rotatory fashion; when the hand has passed into the bowel, the fingers can be separated a little so as to explore the pelvic organs; two fingers may be passed on into the sigmoid flexure of the colon. My hand measures, at the line of its greatest circumference, eight inches. I have thus introduced it without lacerating the anus. This is not the rule; even with the greatest care and a small hand, some sphincter fibres will be ruptured, and in some patients it is impossible to introduce the hand without serious injury to the sphincters and bowel. In ordinary dilatation of the sphincters for obstinate costiveness it is not necessary to introduce the hand. It is superfluous to point out how cautious must be the manner in which this procedure is conducted, and how seldom it is needful, considering the other means of diagnosis at our disposal. I may here draw attention to the methods of exploration adopted by Professors Naunyn and Ewald, the former injecting and filling the colon with water by the syphon plan, the latter inflating the intestines with air, so as to make the situation and relation of tumours to or in the abdominal viscera and intestines clear.

The Value of Rectal Exploration in Female Children.

George Carpenter, of the Evelina Hospital for Sick Children, has written some important communications on the value of rectal examinations in the diagnosis of pelvic disease in children. He instances several cases in which grave conditions were discovered through combined rectal and abdominal examination by means of anæsthesia. The patient's legs are well drawn up, and the thighs are flexed on the abdomen. The pelvis is raised on a cushion, and, with the left hand placed on the abdomen, the right side of the abdominal cavity is explored with the right index-finger. The hands are reversed to examine the left side. The bowel and bladder have been previously emptied. The author has thus been able to diagnose and map out the position of a horseshoe kidney. By this means the appendix, the iliac fossa, the uterus and adnexa, may be explored, and the position of tumours or collections of fluid determined. Carpenter's remarks on the relations and dimensions of the female pelvic organs in children are of importance.

The Pelvic Organs in Children.—'The sacrum in children is almost straight, and so is the rectum, the direction of the bowels being probably influenced by that of the bone. The infantile bladder is egg-shaped, with the larger end downwards, and as the pelvis is shallow, it is almost entirely an abdominal organ; but as soon as the child begins to walk the bladder sinks more into the pelvis, though even then its attachments are so loose that it readily rises wholly into the abdominal cavity when distended or otherwise displaced, a feature observed until puberty is near at hand. The uterus in the child is

almost entirely made up of cervix, there being very little body, and it lies in *the upper part of* the pelvis. At birth the ovaries have descended as far as the brim of the true pelvis, but in children a few weeks old they are found close to the external iliac arteries at the side of the pelvis.

'I have found, however, the uterus and appendages well above the brim of the pelvis on making a rectal examination in a child seven months old. Fig. 84 is a sketch of the tubes and ovaries of a child aged two years and four months that I made *ad naturam*, which shows the relative positions. Another sketch gives the exact size of these organs when removed from the body. It will be seen that the uterus is about 1 inch long and $\frac{1}{2}$ inch broad at the fundus, the tubes about $1\frac{3}{4}$ inches, the right ovary $\frac{5}{8}$ inch in length, and the left $\frac{1}{2}$ inch

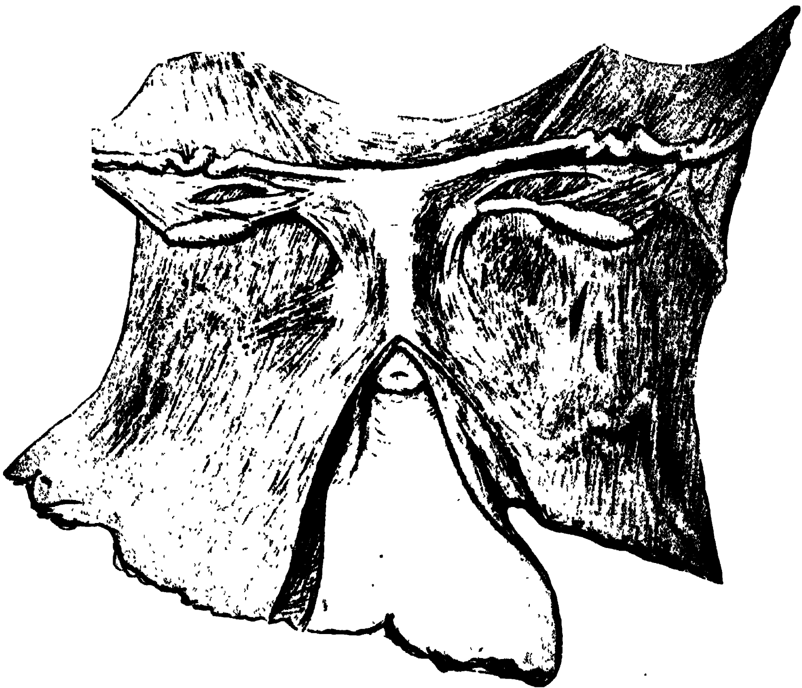


FIG. 84.—GENITAL ORGANS REMOVED FROM A FEMALE CHILD, AGED TWO YEARS FOUR MONTHS. Vagina opened behind, showing the external os uteri. The ureters are dimly outlined on either side. The round ligaments are ill developed. (George Carpenter.)

in length, and each about $\frac{1}{8}$ inch in diameter. The ovaries vary in size from $\frac{5}{16}$ inch long by $\frac{1}{4}$ inch broad in a child a few weeks old, to organs measuring $1\frac{1}{2}$ inches by $\frac{1}{2}$ inch in a child approaching puberty. Intermediate sizes are found according to the age of the child, but ovaries show some variation in size in children of similar ages. The organs are for the most part elongated oval in shape, but organs that are more or less round are occasionally found, and one ovary is not infrequently decidedly larger than its fellows.

The Fallopian tubes, roughly estimating their diameter for clinical purposes, are about equal to the vas at a similar age at their narrowest part, but they gradually enlarge as they pass along to the fimbriated extremity; in length they vary from a little over 1 inch to a little over 3 inches, according to the age of the patient. The important anatomical guide to these structures when making a rectal examination is the falciform ligament. This falciform ligament, or the utero-sacral ligament, if that term be preferred, forms a sickle-shaped curve surrounding the rectum, attached behind to the sacrum, and in front to the lower part of the cervix. This is very well seen in both drawings (Figs. 84 and 85), and when the finger has passed some little distance up the rectum, its sharp edge is readily found, and is unmistakable. Using this structure as

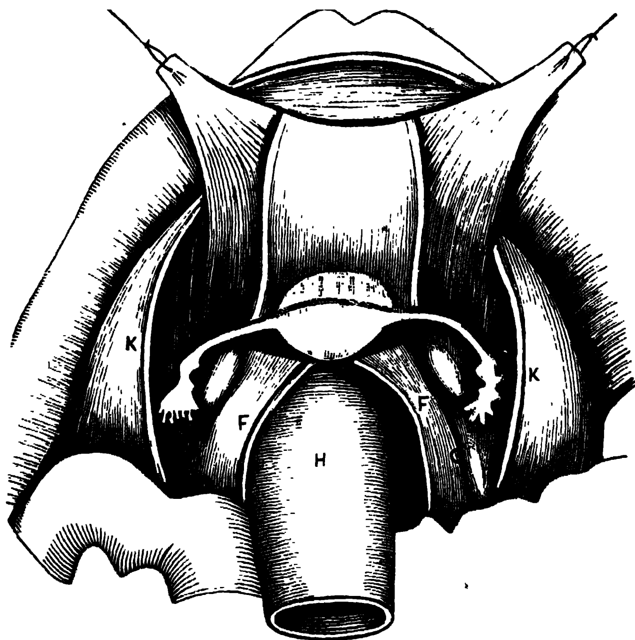


FIG. 85.—PELVIC ORGANS OF A FEMALE CHILD, AGED TWO YEARS FOUR MONTHS. F, falciform or utero-sacral ligaments; G, right ureter; H, rectum; K, brim of pelvis; L, reflected abdominal wall. (George Carpenter.)

a guide, the tubes and ovaries, which, as the drawing (Fig. 85) shows, are on a higher plane, can be readily manipulated between the exploring finger and the bony wall of the pelvis, or bimanually, and whilst these structures are being examined, the ureters, the right being shown in the drawing as it crosses the pelvis and disappears under the corresponding tube and ovary, can be examined.

'It is sometimes possible to detect in the ovaries the small *cysts or dropsical Gräafian follicles*, which are not infrequently found post-mortem. The uterus, being a freely movable body, is not easily detected in this way, and readily

eludes the finger, which pushes that organ before it; but by a bimanual examination any marked abnormality can be easily appreciated, if the bladder be emptied. In young children the uterus can be rolled between the finger and the symphysis pubis, and its contour made out with ease.

'*Displacements of the ovaries and tubes* into the inguinal and crural openings sometimes occur. The youngest ovariotomy on record is by Chiene,* of Edinburgh, in a child of three months. A swelling in the inguinal region suddenly occurred, and when various measures had been adopted for its relief, the infant was operated upon. The contents of the sac were the ovary and Fallopian tube. A rectal examination was not made, but if it had been, a fresh light might have been shed on the case.

'*Tuberculous disease of the Fallopian tubes, the uterus, or the ovaries* is extremely rare in children; and so rare is it that I think I could count on the fingers of one hand the number of cases I have seen diseased in this way, both in the dead-house and, what I have supposed to be tuberculous, in practice. The pathological specimens in museums are few and far between. In the Guy's Hospital museum there are but two specimens: one, 2251[10] (Bright. 1829), aged eleven years, who died of "strumous inflammation of the brain" and lung tubercle; another older specimen still, 2251, of a child with tortuous tubes distended with cheesy matter. Chaffey † published a case of a child of four years, whose tubes were caseous, as was also the upper part of the uterus; she died of general tuberculosis. Silcock ‡ also records a case of a child of five years of age, who had tubercular salpingitis, endometritis, and a tubercular deposit in the body of the uterus the size of a walnut; she also died of general tuberculosis. Arthur Cheatle,§ when registrar at the Evelina Hospital, found in the post-mortem room, in a child of twenty-one months, tubes filled with pus, the left being in communication with an abscess cavity holding one drachm. This case also died of general tuberculosis.'

Ovarian Disease in Infants.

Carpenter gives the particulars of a case operated upon by Eve, in which an ovarian cyst burrowing down between the layers of the broad ligament was diagnosed by rectal examination in a child aged twenty-two months, the subject of congenital syphilis. The cyst measured $1\frac{3}{4}$ inches by $1\frac{5}{8}$. Carpenter has collected the particulars of thirty-five cases of ovariotomy performed on children under twelve years of age—viz., dermoids, 15; cystic, 10; sarcoma, 6; carcinoma, 2; malignant tumour, 1; cylinder epithelioma, 1. Roemer's case of successful ovariotomy was in a child twenty-one months old. Rosenstein found carcino-sarcoma of the uterus in a child aged two years, and sarcoma of the vagina has been recorded in several cases under twelve years.

Discharges.—In inflammatory states of the female genito-urinary organs, the nature and character of the discharge found, on vaginal examination, coming from the uterus, or in the vagina, and

* *Edinburgh Medical Journal*, 1884, p. 1132.
† *Path. Soc. Trans.*, vol. xxxvi., p. 303, 1885.
‡ *Ibid.* § *Lancet*, 1891, p. 1098.

spontaneously appearing at the vulva, is of considerable moment in the diagnosis.

The following table will assist the student:—

DISCHARGES.

CHARACTER.		APPEARANCE AND PROPERTIES.
WATERY (hydrorrhæal), and mixed.	*Uterus.* — Accompanying and following pregnancy; associated with malignant disease, hydatids. *Vagina.* — Vesico-vaginal fistulæ, rupture of ovarian cyst. Discharge frequently physiological, both from uterus and vagina; the quantity of water the vagina can secrete is shown in the profuse discharge after a glycerine plug is worn in it.	At times colourless, or mixed with blood, and with cells of different kinds, or containing shreds of decomposing débris, or hydatids, or urine.
MUCOUS AND EPITHELIAL, often containing epithelial débris, oil-globules. Frequently only physiological exaggeration of the normal secretion, as in pregnancy, or associated with menstruation.	*Fallopian tubes.* *Cavity of fundus uteri.* *Canal of cervix uteri.*	Whitish, alkaline, columnar epithelium; at times viscid, like unboiled white of egg; when aggravated, fills the cervix and os uteri as a tenacious plug most difficult to remove, and is quite characteristic of endometritis. It may be the cause of sterility. Where the secretion is simply increased, and attends corporeal leucorrhœa, it is known as the 'whites,' and is, as a rule, a proof that the general health is suffering, as in anæmia, leukæmia, and after metrorrhagia.

DISCHARGES (*continued*).

CHARACTER.		APPEARANCE AND PROPERTIES.
	External surface of cervix and the lips of the os and fundus of the vagina. Seen occasionally in excess during pregnancy.	Acid reaction; varies in consistence—generally thick, creamy, white, or yellowish white, adhering often closely to the os and cervix uteri, and almost membranous in character; squamous epithelial cells, oil-globules.
	Some portion of the vagina.	Acid mucus; character depends on the nature of inflammation; contains at times parasites and fungi—*Trichomonas vaginalis; Leptothryx buccalis.*
SEBACEOUS, readily becoming purulent.	*Vulva, labia, vulvo-vaginal glands, sebaceous glands.*	Acid fatty mucus, oily particles, epithelial cells.
PURULENT.	*Fallopian tubes.*—Pus the result of salpingitis. *Uterus.*—Any part of the uterus, mingled with mucus. *Vagina.*—Pus may find its way into the uterus through fistulous openings, and into the vagina either by the bursting of a suppurating cyst which has formed adhesions, or the escape of pus from a pelvic abscess, the consequence of pelvic peritonitis, or a pelvic hæmatocele. The source of this pus may be a fistulous opening from the bladder or	The appearance of the purulent secretion will, in great measure, depend on its source and the form of inflammation that has produced it; it may be profuse and thick, scanty and thin, very fœtid or almost odourless, tinged with blood or rusty-looking, or of a dirty greenish colour. The discharge of vaginitis is, as a rule, profuse, pouring out in quantity, and, especially if it be gonorrhœal, thick,

Discharges (*continued*).

CHARACTER.	SOURCE.	APPEARANCE AND PROPERTIES.
	urethra in cases of pyelitis or cystitis.	yellow, and persistent. It is mingled with epithelium.
	Causes.	
HÆMORRHAGIC (excluding the hæmorrhages of pregnancy).	Blood may pour from any portion of the generative tract. We may thus classify the occurrence of all hæmorrhage: *Uterine.*—1. Menstrual or altered menstrual flow. 2, In salpingitis, metritis, endometritis, glandular, granular, fungous, catarrhal cervicitis, laceration of the cervix, syphilitic disease, malignant disease, subinvolution, uterine fibroid, polypus of any kind, granulations, vascular tumours, urethral caruncle. 3. Uterine flexions and versions. 4. Traumatic injuries — operations. 5. Ectopic gestation.	The blood may be arterial or venous, dependent upon its cause, whether there be active or passive congestion, due to direct rupture of vessels from ulceration and slough, or their injury by laceration, or wounds of any kind. In the various morbid conditions of the blood, and during the exanthemata, the blood poured out is generally dark and does not readily coagulate, rendering the hæmorrhage difficult of suppression.
	Vagina.—Same constitutional causes as produce hæmorrhage from the vulva; granulations; abrasions; ulceration; varicose states; thrombus; traumatic causes; malignant disease. *Rectum.* — Hæmorrhoids; congestion of the rectal mucous membrane; fissure; ulcer; malignant disease; traumatic causes. Bleeding from the rectum may accompany hæmorrhagic discharge from the vulva and vagina.	The blood at times is mixed with menstrual discharge, or is merely altered menstrual flow, excessive in quantity (menorrhagia); the blood is then mixed with the débris of uterine tissue, epithelial cells, fatty and oil particles, mucous corpuscles, or if there be ulceration, pus, and the products of inflammation.

DISCHARGES (*continued*).

CHARACTER.		APPEARANCE AND PROPERTIES.
	Vulva; in the exanthemata—(variola, typhoid and typhus fevers, measles); spinal meningitis; malignant ulceration; gangrene; noma thrombus, varicose conditions; various blood states, as in leucocythæmia and scurvy; in the hæmorrhagic diathesis; wounds, operations, coitus; from vascular excrescences, and tumours.	
(2) HÆMORRHAGE connected with menstruation and often associated with irregularity of the menstrual periods.	1. Simple menorrhagia—physiological excess attendant upon ovulation; in plethoric states from excess of coitus; excessive menstruation at the 'change of life'—during the menopause; from suppressed skin secretion—the result of cold taken previous to or during menstruation.	
(3) HÆMORRHAGE due to disease elsewhere.	2. Uterine hæmorrhage dependent upon hepatic, cardiac and renal affections; in phthisical states.	
AIR (physometra). The air is expelled by the muscular action of the vaginal wall.	*Uterus and Vagina.*—In the knee and elbow position air enters the vagina more or less readily when the vaginal walls separate; also in the semi-prone position. Air may accumulate when a pessary is worn, if there be a fistulous communication with the bowel, or in prolapsus uteri.	

Fistula.—Most careful exploration of the vagina, uterus, and rectum is necessary in order to detect a minute fistulous communication of the vagina with the bowel, or of the uterus with either the bowel or bladder. The injection of a little milk or coloured fluid may assist in the detection.

The Microscope.—We bring the microscope to our assistance in the examination of suspicious discharges; in determining the nature of the cells contained in cysts—ovarian, hydatid, or malignant, and in hæmaturia. It is essential in doubtful cases, where we suspect tuberculosis, and in the bacteriological examination where we suspect gonorrhœa and inveterate discharges. All débris removed after curettage should be carefully examined and reported upon, and the report preserved for future reference.

The Ophthalmoscope in Diagnosis.—Did space permit, I might enter more fully than I am now enabled to do into the subject of ophthalmoscopic examination, in the diagnosis of uterine affections, and other diseased states which either complicate or originate the retinal disorder. It is not too much to say that every educated physician and surgeon should at least know sufficient of the ophthalmoscope to be able to diagnose an albuminaric retinitis, a hæmorrhagic infarction due to temporary retinal congestion, a choked papilla, the retinitis attendant upon diabetes, the striæ and exudation of syphilis, the disseminated choroiditis of the same disease, the retinitis of pernicious anæmia, or the leukæmic retina of anæmia and leukæmia. This practical acquaintance with the use of the ophthalmoscope is of still greater value in the diagnosis of diseased conditions both during and after pregnancy.

It is well known how frequently some retinal extravasations are the result of secondary cardiac mischief, which has its source in vascular changes due to morbid states of the blood—as, for instance, in Bright's disease or diabetes. Most important are such ocular disturbances in pregnancy. This is obvious when we remember the effect produced on the blood by pregnancy, and the relative importance which such disturbances bear to the safety of the patient—both as an indication of head complications and other hæmorrhagic discharges, either before or during labour.

L. de Wecker cites the following case ('Ocular Therapeutics,' trans. by Litton Forbes):—

'I was requested to examine a young American lady, twenty years of age, who was in her seventh month of pregnancy, and who complained that her sight had been somewhat dim during the last few days. Her husband begged

me to examine her that very evening, although to do this I had to disturb a large dinner-party, which neither the condition of her sight nor health prevented her taking part in. I found that there was a very slight haziness of the retina in the neighbourhood of the papilla in both eyes, and deferred further examination till the next day. At ten o'clock the following morning the ophthalmoscope showed on the left, near the papilla, a small extravasation, which certainly could not have escaped my investigation of the previous evening. Meeting a colleague, in consultation, I informed him of the fresh hæmorrhage in the left eye and the increased haziness of the papilla, and begged him to allow premature labour to be brought on. I felt convinced that it would not be long before serious brain symptoms would declare themselves, and that in any case this primipara would not arrive at her full time without some accident. One of the most celebrated accoucheurs in Paris was called in further consultation, but I was unable to convince him of the urgency of this danger. During the night which followed this consultation —that is to say, four days after the first ophthalmic examination—the patient was seized with convulsions, following each other in rapid succession. In all haste Dr. Campbell was sent for, but he did not feel justified in forcibly delivering a patient who lay unconscious and in a moribund condition. Death occurred the following night.'

There can be little doubt that at least 10 per cent. of cases of Bright's disease suffer from retinal complications. This is placing the number at a low figure.

A short time since, a patient came a long distance to consult me for failing vision in both eyes. On examination, well-marked nephritic patches were seen on the retina in one eye, and the characteristic scattered dots in the other. The urine had a specific gravity of 1008, no albumen present, but there were renal casts and epithelium; the other symptoms pointed to the presence of granular kidney, which up to this had been unsuspected.

A primipara, aged 26, in the fifth month of pregnancy, was sent to me by Dr. Atkinson, of Surbiton. There were ocular symptoms, twitching of the eyelids, dimness of vision, with some pain and frontal ache. There was some 50 per cent. of albumen in the urine. The papillæ were hyperæmic, and there was a surrounding haziness. Labour was induced the following day at 3.30 p.m., convulsions beginning at 11 p.m. The uterus was emptied at 1 p.m., an adherent placenta giving some trouble. The patient was kept under chloroform from 11 p.m. until 2.30 the following day, convulsions recurring on any withdrawal of the anæsthetic. A subcutaneous injection of one-tenth of a grain of nitrate of pilocarpine was then administered, producing rapidly its full physiological effects, after which the convulsions ceased, and the patient made an excellent recovery.

Not in this case only has it been my lot to be the first to discover—by the ophthalmoscope—the danger that threatened the patient, and I feel assured that were the use and knowledge of this instrument generally insisted on, many diseases would be more frequently recognized in their

earlier stages, and a timely warning given. In noticing L. de Wecker's allusion to the contra-indication of hot baths in retinal lesions dependent upon nephritis, I am reminded of three cases of sudden death occurring within my own experience which were caused in this manner. One instance was that of a lady who noticed that her vision was affected for a few days, and called on me to have an examination made. I happened to be absent. She left word that she would come the next day. That night she took a hot bath, which she had frequently taken

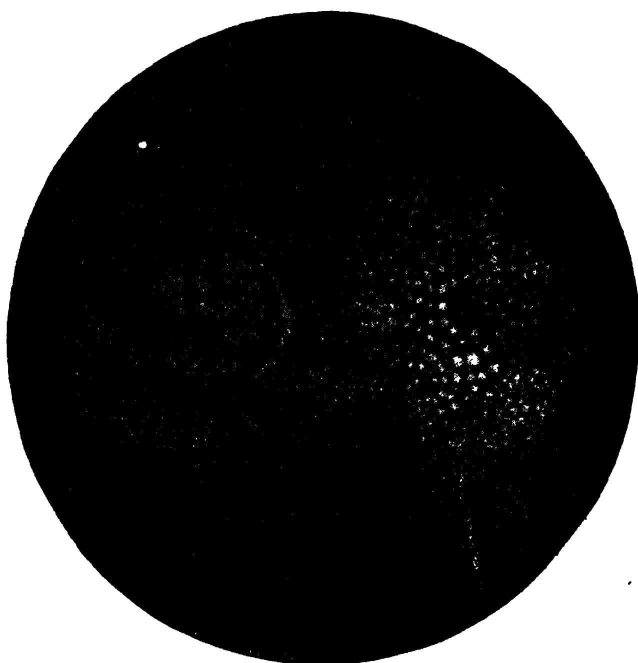


FIG. 86.—CENTRAL CHORIODO-RETINITIS. APPEARANCE OF THE LEFT FUNDUS FOLLOWING UPON PARTURITION AND SEVERE POST-PARTUM HÆMORRHAGE.*

before, was attacked while in the bath, and died in a few hours of apoplexy. An ophthalmoscopic examination that day might have saved her life.

I could multiply instances in which both the detection and diagnosis of existing disease have been due to the ophthalmoscope. 'The retinitis of malignant anæmia is so constant,' says L. de Wecker, 'that it may be looked on as pathognomonic.'

* The patient, aged thirty, sent by Dr. William Slimon, was seen by me six weeks after labour. The papilla was partially atrophied. The group of white

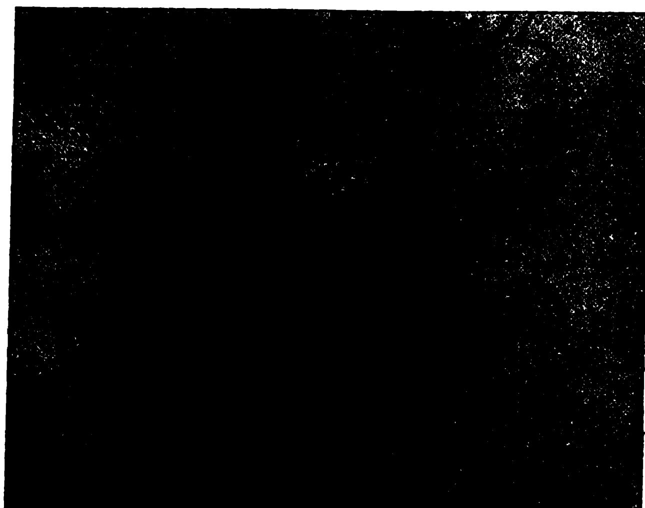


FIG. 87.—CHOKED OPTIC PAPILLA OF THE PATIENT REFERRED TO AT p. 107, OCCURRING DURING SUPPRESSION OF THE CATAMENIA.

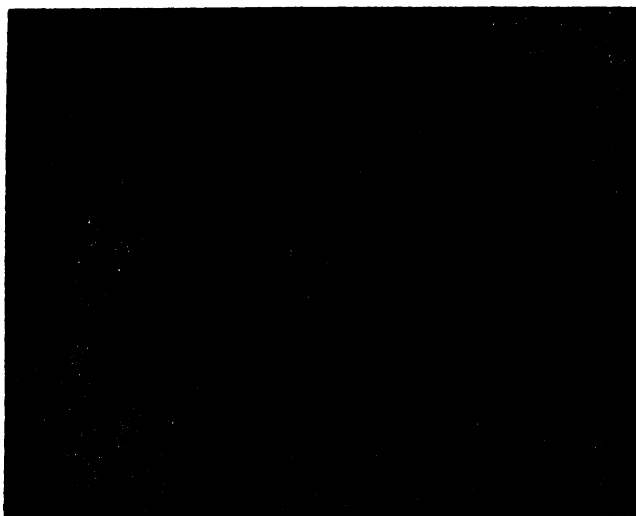


FIG. 88.—SAME PAPILLA WHEN RECOVERING.

Not long since a lady suffering from well-marked diabetic retinitis of both eyes came under my care; in each eye there was a hæmorrhagic effusion. Again, in a case of pruritus complicating visual trouble, the state of the retina led to a urinary examination, and confirmed the suspicion of diabetes. Recently a patient consulted me for loss of vision in one eye, and impairment in the other, due to thrombosis of a retinal vessel in the region of either macula, occurring at the menopause.

The patient from whom the drawing was taken never had had any affection of the eye before parturition. Three days after her labour, which took place on January 7th, when very severe post-partum hæmorrhage occurred, she found the vision of the right eye defective. She was sent to me by Dr. Wm. Slimon on the 20th of the following February. On that date the appearances were as shown in the drawing, which was carefully made a few days subsequently by Mr. Burgess. The vision then was reduced to the counting of fingers at a distance of 5 feet. The entire region of the macula was dotted over with white dots. It presented much the look of a retina suffering from Tay's 'choroiditis guttata' (centralis), or the spots of 'disseminated choroiditis' which has been described by various authors.

In this case there had been no albuminuria during pregnancy. The vision was suddenly affected, and the appearances are quite distinct from those seen in the retinitis albuminuria of pregnancy and Bright's disease. It seems to me that there was after the labour some infarction of the retinal vessels following on the severe uterine hæmorrhage, and that possibly a state of thrombosis was induced. This set up an irritation in the region of the mascula, which was followed by the peculiar effusion. The exact nature of these dots is not understood. Hutchinson believes them to be colloidal.

The experience gathered from thirty-eight years' ophthalmic practice impels me to urge on the obstetric practitioner and student the great value in diagnosis of this simple instrument.

I can only repeat that I have known persons whose symptoms were ascribed to amenorrhœa, hysteria, anæmia, a disorder of pregnancy, a dyspeptic state, gastric disturbance, or liver derangement, in whom an ophthalmoscopic examination and the discovery of optic neuritis, choked disc, detached retina, retinal apoplexy, pulsating vessels, Bright's degeneration, or syphilitic effusion, would have afforded a clue to a correct diagnosis.

The following case will serve to illustrate these remarks :—

Miss C——, aged thirty-four, consulted me on July 3rd for sudden loss of vision in the right eye. Menstrual periods had not been very regular for some time, and the loss of sight occurred just at the approach of a catamenial epoch. The menstrual irregularity was attended by general failure in health, but she

---

dots is seen in the region of the macula. Here also were some remains of hæmorrhagic infarctions. The group of dots was quite distinct from uræmic patches. It corresponds with the retinitis guttata of Mr. Nettleship. This patient died four years subsequently of uræmic and other complications.

had not given up her employment. She first noticed the sight affected on June 29th. She could then barely discern an object. On examination of the fundus, the optic disc presented the appearance shown in Fig. 87, drawn on July 4th and 5th. From this latter date the eye was placed under the influence of eserine, 1 per cent. As it caused slight pain, I then substituted pilocarpine, 1 per cent. Also she took internally ʒi. doses of the liquid extract of ergot. On July 18th she read $\frac{20}{70}$ (Snellen), and on July 23rd was able to read $\frac{20}{30}$. On this day I again examined the fundus. The appearance of the papilla (June 24th) is shown in Fig. 88. There was no assignable cause, save the menstrual association, for the thrombosis. There was no albuminuria. Pain in the eye or head was absent. The relief afforded by the treatment has been permanent. This may be explained by the freedom of the macula from effusion.

Eye-strain in Women.—I would here draw attention to a most important complication which will be found in a certain proportion of patients who consult us for female disorders. I refer to eye-strain, with all its consequences on the nervous system. This eye-strain, due to errors of refraction, is often followed by such symptoms as headache, difficulty of thought concentration, nausea, and neuralgia. Even epileptic seizures have been proved to have their origin in an uncorrected astigmatism. These effects are especially accentuated in many women prior to, and during, menstruation. Naturally, they are more felt in the instance of a neurasthenic woman who is suffering from the dual trouble of the refractive error and some menstrual aberration. Hence we find them frequently present at puberty, during pregnancy, and in the climacteric. This association is specially worthy of the attention of the gynæcologist, as not infrequently disorders of the pelvic viscera are present.

In the chapters on 'Uterine Neuroses' sufficient evidence will be found of the concurrent occurrence of aberration of function in the generative organs with disturbance of the brain or cranial nerves.

At the annual meeting of the British Medical Association, 1895, I read a paper in the Ophthalmological Section on this subject, pointing out that in the unstable state of nervous excitability or irritability, to which women suffering from pelvic disease are liable, there is a predisposition to central effects of possibly slight peripheral ailments. I then gave the particulars of fifty cases of women of various ages who consulted me within a comparatively short time, most of whom suffered from some form of pelvic disorder, and in whom the symptoms above referred to were present. Not one of these patients attributed any of the symptoms to a visual

defect, yet in all there were varying degrees of astigmatism, in the great majority relief from the head symptoms following on the correction of the refraction by suitable lenses. A few cases are sufficient to illustrate the point I desire to emphasize—viz., that in women who suffer from such symptoms as headache, nausea, mental fatigue, and difficulty in concentration of thought, errors of refraction should be sought for as part of the general treatment of the case :—

A young lady, aged twenty-two, a proficient musician, suffered from various local and other symptoms, which, upon examination, were found to be due to retroversion of the uterus. Attendant upon these was constant and severe headache. This, it was hoped, would disappear with the rectification of the displacement. As she had to leave home for some time, she was advised to see me, to ascertain whether the uterus was keeping its position, and as to the need for continuing to wear the support. This she did, complaining at the same time of the continuance of the very bad headaches, though she had recovered from her other local troubles. On examining the eyes, I found that she had myopic astigmatism, which had never been corrected, as she was wearing simple spherical glasses for all work. With -.75 cyl. added to her spherical lenses, this was completely corrected, and when last I saw her, her headaches had ceased.

Mrs. ——, aged forty-six, had suffered from severe headaches on and off for years. She was now in the menopause, with irregular catamenia. Her headaches had of late become much worse. Further than an enlarged uterus, with some tenderness, there was no pelvic trouble. She had never suspected her eyes as a cause of her headaches. Several teeth were carious; these were removed. On examination, I found hyperopic astigmatism, which was completely corrected. When I last heard of her, about one month after wearing the glasses, her headaches had completely disappeared.

Mrs. H——, aged forty, consulted me for general ill-health, including metrorrhagia and other pelvic symptoms. She had as violent head pain as I have ever known of. All the teeth in the upper jaw, being carious, had been extracted for this latter symptom, without affording relief. She had a uterine cervical erosion and endometritis. She was cured of these latter troubles, but the head symptoms continued. On examination of the eyes, I found myopic astigmatism of the right, and hyperopic of the left eye: -2·5 cyl. (vertical) in the right eye, + 0·25 spher. and + 0·25 cyl. (horizontal) in the left eye, brought her to nearly $\frac{6}{8}$. She has been completely relieved. Careful attention in all cases was paid to any attendant asthenopia, and any errors of insufficiency were corrected by prisms.

***Exploratory Incision.*—Having exhausted all our means of diagnosis, and doubt still remaining, in a case of abdominal tumour, where the question of operation arises, there are yet abdominal incision and exploration. This step is not to be resorted to save as a *dernier ressort*, as in itself it is not devoid of danger. Every**

aseptic precaution is taken before and during the exploration. A small incision is made through the skin over the linea alba. The knife is carried on carefully through the cellular tissue, fat, tendinous structures, and subperitoneal tissue. All bleeding is arrested by torsion or ligature. The peritoneum is now examined. The shining wall of an ovarian cyst may be seen lying underneath. The peritoneum is next carefully raised by a tenaculum, or caught up in a fine forceps, and a small opening made which is enlarged on a director for the extent of an inch and a half to two inches. We are thus, with two fingers, enabled to examine an adjacent cyst-wall, search for adhesions, or explore the abdominal cavity.

Examination of the Rectum.—When the rectum has to be

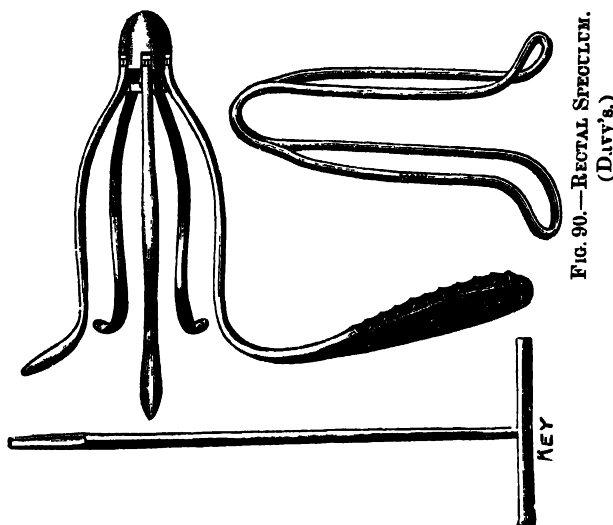


FIG. 90.—RECTAL SPECULUM. (DAVY'S.)

FIG. 89.—RYALL'S EXPANDING RECTAL SPECULUM.

examined for fistulæ, fissures, ulcers, or hæmorrhoids, we may require a speculum (Figs. 89–91). The educated finger of the surgeon who is familiar with the feeling conveyed by the margins and roughness of an ulcer, the internal aperture of a fistula, the ridge and sharp sulcus of a fissure, the contraction of a stricture, the hardness and irregular surface, often easily bleeding, of malignant disease, gives the most reliable and certain information. The patient is placed on the couch, the nates are drawn well to the edge, and the thighs flexed.

I seldom use any rectal speculum. I show three which are in common use—those of Ryall, Gowland, and Davy. Ryall's rectal

speculum is an ingenious instrument. I refer to it in the chapter on the Rectum.

PROCTOSCOPY.

Howard Kelly practises proctoscopy by means of the proctoscope—



FIG. 91.—RECTAL SPECULUM. (Gowland's.)

a rectal speculum protected by an obturator. The light from an electric lamp is cast into this from a forehead mirror. The buttocks

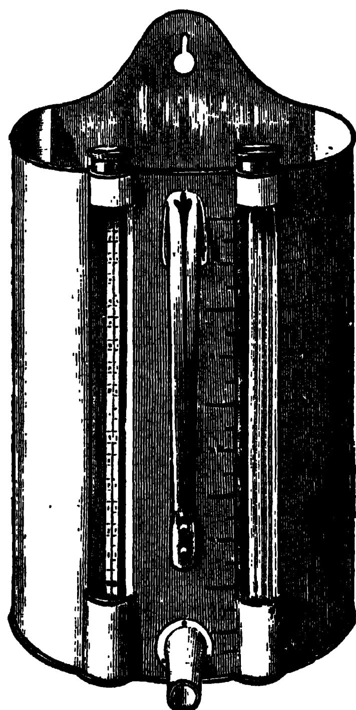


FIG. 92.—DOUCHE WITH TEMPERATURE AND WATER-GAUGE.

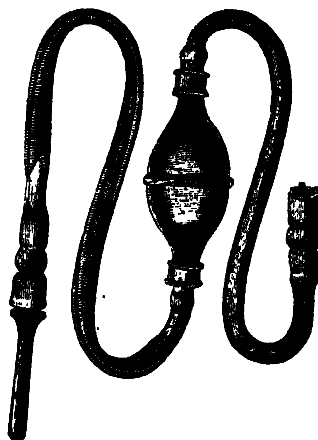


FIG. 93.—'ALPHA' VAGINAL SYRINGE. The vermicular outlet tube gives a continuous stream. It is a most useful syringe. (Stearn's, of New York.)

of the patient, who is in the knee-elbow posture, are placed against uprights, to which the thighs are fixed, and thus the surface of the

mucous membrane is inspected. (See chapter on Rectum, for the illustration of Howard Kelly's method.)

Examination of the Urethra.

To explore the urethra, I employ my dilators (Fig. 79). Gradual dilatation can be finally completed with the finger. If nothing else

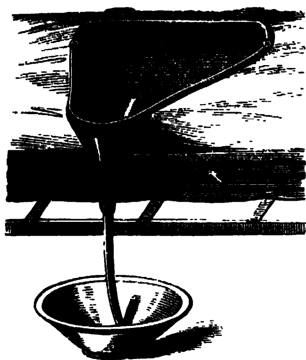


Fig. 94.—Smester's Funnel for Vaginal Injections. (Pozzi.)

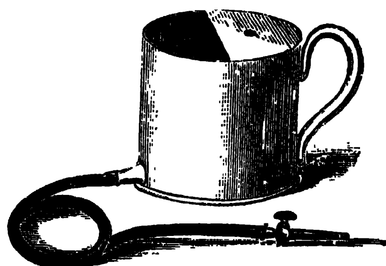


Fig. 95.—Porcelain Hand Douche.

be at hand, a small glove-stretcher may be used. Howard Kelly's method of examination of the bladder and ureters—as also Kolli-

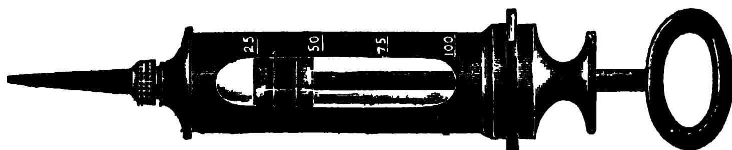


Fig. 96.—Vulcanite and Glass Syringe for Uterine and Bladder Injections.

ker's and Winter's cystoscope and method of cystoscopy—are described in the chapters on the Bladder and Ureters.

CHAPTER IV.

ASEPSIS AND ANTISEPSIS IN GYNÆCOLOGICAL SURGERY.

WITH regard to hospital methods for securing asepsis, there can be no possible excuse for even the slightest defect in any of the details of aseptic surgery. Here economy has seldom to be considered. In his theatre, appliances and assistance, both before, during, and after operations, the surgeon is amply provided for; and it is simply unpardonable if any accident occurs which can by possibility be traced to a flaw in the methods.

It is, therefore, rather with a view to insisting on the need for caution *outside* the hospital operating theatre and ward that I write this short summary of the methods that I myself pursue. I have not the least doubt that there is still, even with all our knowledge of the vital importance of asepsis, a great deal of inexcusable negligence in the manner in which this first essential of the modern surgical art is achieved; in short, there is much that is casual in the manner in which preparations are made, and the regard that is placed on such precautions. Possibly this may arise from the fact that though in a misty sort of way the need for them is recognized, it has only been of recent years that the profession generally has begun to realize their vital necessity. This observation applies to surgeon and nurse alike. Looseness in the education of both has generated a corresponding laxity in their ideas as to how complete asepsis is to be maintained; and we are now in that transition stage between the older practices of simple antisepsis, often indifferently carried out, and the far more scientific and correspondingly difficult aseptic procedures of the present day. Those educated under the old plan find it difficult to adapt their surgery to the demands of the latter, nor in some respects can we blame them, when we yet find responsible teachers and operators who speak slightingly of the unnecessary refinement of care with which the Continental and American surgeons carry out aseptic surgery.

Convinced of the extreme importance of exact attention to the minute details as well as to the general principles of asepsis and antisepsis, my object is to lay down precise rules, based on my own experience and that of others, to be observed in the arrangements of the operating-room, the preparation of the patient, the operator, and his assistants, and the care of instruments, dressings, and other appliances, dealing with the matter more especially from the point of view of the abdominal surgeon and gynæcologist. And in order to make these observations as practical and useful as possible, I shall enter into the question of the installation of a private operating-room with everything that is essential to the purpose.

I am in perfect agreement with the views of Doyen * that 'when we lose a patient who has been operated upon, the most common cause of death is infection within the operative tract,' an infection facilitated by the reduction of the vital resistance brought about in enfeebled and in cachectic subjects, particularly among the cancerous. Many surgeons (we cannot too strongly insist upon this point) commit the grave error of believing themselves *à priori* aseptic, and account for their failures by causes other than the direct infection from the wound. This pretension to infallibility in antisepsis is as ridiculous as it is dangerous. Even in cases where complications occur at a distance from the field of operation, such as bronchitis, pneumonia, phlebitis, etc., it is very rarely found that they arise from any cause save as the direct consequence of interference. 'If the patient should succumb,' says Doyen, 'carefully study the probable causes of death, and question your memory on the minutest details,' and he goes on to remark that to an interference, out of all proportion to the vital resistance of the patient, which has been too prolonged, or to infection alone, we may often ascribe the fatal issue, and still more frequently to both causes combined. This conclusion he says he has come to as the result of many years of experience, acquired in the service of various hospitals in which bacteriological observations of the most searching kind were conducted as to the cause of death after operations.

This fact has always to be remembered by those who profess to ignore strict asepsis in their operations—that no matter how brilliant their results may be, if they have lost a single case through neglect of aseptic and antiseptic precautions, they have dearly paid for their antagonism to the almost universal practice of the day.

* Doyen's 'Technique Chirurgicale' (Paris: Masson and Co., 120, Boulevard St. Germain).

Some may consider that certain minute details are carried to extremes on the Continent and in America. I do not think so. There may be limits to our possibilities in private 'homes' and houses, but there are no such limiting conditions in our hospitals. Far better this attention to the minutest details, than that the entire system should be rendered ridiculous by glaring oversights on the part of operator, assistants, and nurses, in the handling and transferring of instruments, ligatures, and sutures, in the casual exposure of these to sources of infection before and during operative manipulations, and by other faults of omission and commission. Such errors have justly brought severe criticism on our British antiseptic methods—criticism which cannot be answered. This should not be so in the birth-place of antiseptic surgery. Call it by whatever name we may, the surgical world, at the close of this nineteenth century, with such few exceptions that they seem only to prove the rule, has accepted the teachings of Lister, and the universality of that acceptance, as well as the results of the adoption of those teachings, are unanswerable testimonies to their truth. No theory in the history of medicine has been subjected to more universal, more crucial tests, by observation or experiment, than that of the germ theory in wounds, in relation to septic changes in these. The practical result has been the universal adoption of antiseptic surgery, and no department of the surgical art has benefited more by the use of antiseptic and aseptic methods than that of gynæcolbgy.

I may here observe that these directions for the conduct of aseptic preparations, and the completion of a thoroughly aseptic operation, are written after somewhat prolonged visits to the *Frauen-Kliniks* of Martin, Olshausen, and the Landaus in Berlin, that of Schauta in Vienna, and the *clinique* of Terrier and Hartmann at the *Hopital Bichat*, as well as the installation of Doyen in Paris.

'Asepsis' and 'Antisepsis.'—The differentiation of the terms 'antisepsis' and 'asepsis' is hardly understood. The need for separating into two distinct categories septic and aseptic operations is not fully appreciated or realized, either by surgeons or nurses. Antisepsis before, and asepsis during, an operation, should be secured by methodical and systematic precautions never departed from. This is an invariable rule.

It is no infrequent occurrence for a nurse to constantly assure one that she is thoroughly versed in both antiseptic and aseptic methods, and yet to find that when she is subjected to the practical

test of attendance upon an operation and attention to a case, she is deficient in many of the first principles of her work. There can be only one standard for the hospital surgeon on the one hand, and the practitioner or surgeon who operates in the private 'home' or house on the other; and though the latter may not be able to achieve that degree of perfection which should always be at the command of the former, still he must strive, so far as it is within his means and possibilities, to do so. Fortunately, in consequence of all the recently constructed appliances which render it easy for the surgeon to carry with him, without danger of contamination from any outside source, all his sterilized instruments, dressings, compresses, and sponges, as well as his various ligatures—and not only these, but also the sterilized nail-brushes, antiseptic soap, and the overalls for himself and assistants—the operator can reduce his risk of failure in detail to a minimum. And there is no longer any excuse that can be advanced, either on the part of those who have to prepare for an operation or of the operator, that the person whose life he is taking in his hands should be subjected to an unnecessary risk, for the incurring of which there can be but two explanations—ignorance or negligence.

It may not, then, be without advantage to emphasize what true antisepsis and asepsis really mean. By *asepsis* I understand an absence of all septic organisms. This condition is secured by certain methods which have relation to the disinfection of the hands of the operator, assistants, and nurses; to the purification of the area of operation before, during, and after surgical intervention; and to the cleansing of the instruments, sutures, sponges, dressings, and other appliances employed. When no pathogenic organisms are present in any of these situations, the condition is one of asepsis.

By *antisepsis* I understand any or all of the methods by which such absence of septic germs is obtained. These methods will therefore include disinfection by hot air, steam, boiling water, and the use of the various chemical germicides that destroy or render inactive the pathogenic organisms.*

For many years a condition of perfect asepsis in operations has been the ideal of surgeons. It is hardly too much to say that even

* Terrier well classifies the indications that must be fulfilled in order to arrive at a perfect aseptic method: (1) Antisepsis of the part to be operated upon; (2) antisepsis of the hands of the operator and his assistants; (3) asepsis of all the instruments or objects which, during an operation, may come in contact with the wound; (4) subsequent effective aseptic protection of the wound during the healing process.

at the present day the best results obtained are only an approximation in the direction of that ideal. But of this we may rest assured, that the nearer we come to its realization the nearer, also, we shall attain to the elimination of all preventable morbidity and mortality after operations.

A fundamental difficulty in the securing of perfect asepsis lies in the fact that various organisms, some of them pathogenic, are constantly present in the skin, in the digestive canal, and in the female genital passages up to the os uteri internum; of those inhabiting the skin, at least one organism, the *Staphylococcus pyogenes albus* (*Staphylococcus epidermis albus*, Welch), lies deeply in the epidermis, or hair follicles, beyond the reach of any antiseptics. On the other hand, it is to be remembered that infection depends not only on the presence of a germ, but also on the weakening of the resistance of the tissues; consequently, with favourable circumstances, an organism, otherwise pathogenic, may be in fact inert, so that, as Howard Kelly truly says, 'a fresh wound containing these organisms may, from a surgical standpoint, be considered as aseptic when the process of healing is in no way interfered with.'

These considerations bear out the statement made above, that the best results obtained are only an approximation in the direction of an ideal asepsis; and the rule of practice that is binding on all surgeons is thus laid down by Howard Kelly: 'As it is not possible to differentiate beforehand the specific character of the various germs that are present, especially as to their pyogenic properties and virulence, modern surgery *first* proceeds upon the assumption that the skin of the patient, of the surgeon, and of the assistants, the instruments, the dressings, etc., are in an infected state until rendered aseptic by the use of antiseptic measures; and *secondly*, it endeavours to maintain the aseptic condition thus established throughout and after an operation.'

THE OPERATING-ROOM.—My object being, as I have said, to dwell rather on the necessity that exists *outside* a public hospital for the adoption of as complete asepsis and antisepsis as may be secured, I desire to show how a small private operating-room can be constructed at a comparatively small cost, and, though not as perfect as the theatre of a hospital, can still, so far as the materials for asepsis and antisepsis are concerned, be brought as near to perfection as can be hoped for with the means at our disposal.

The room selected must be well lighted and well ventilated. The best window is a sloping skylight facing the north. The floor may

be composed of square encaustic tiles, or of a well-laid parquet flooring thoroughly saturated with wax, and highly polished. A more economical plan is to have the floor cemented; or as a still cheaper expedient, a highly glazed through and through linoleum may be used. In any case, the floor should be well washed daily, and scrubbed once or twice a week. On the walls and ceiling there should be no ornamentation or projections; and it is an advantage to have all re-entering angles rounded off. The material of the walls should be a hard smooth cement, coated with some kind of enamel.* All walls and shelves should be prepared with this.

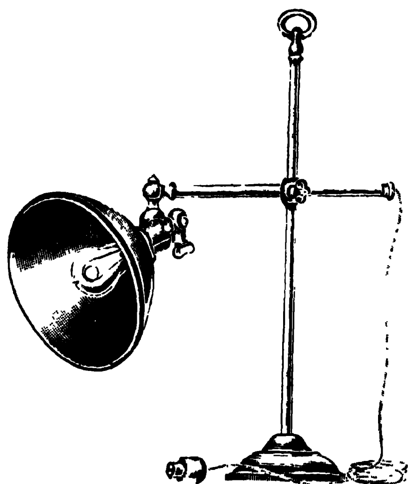


FIG. 97.—PORTABLE ELECTRIC LAMP WITH REFLECTOR. It can be detached and suspended over the operating table.

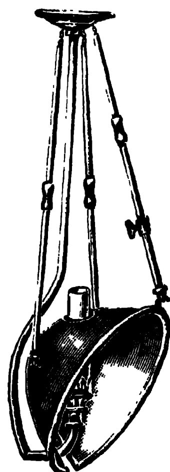


FIG. 98.—REFLECTOR FOR INCANDESCENT BURNER.

For artificial illumination, electric and incandescent lights answer best. One good light should be placed just above the operating-table, and near it should be fixed a bracket, to which can be attached a portable electric lamp. For vaginal operations, two lights may be fixed, placed one on each side, behind and a little above where the operator sits.

The first important item in the furnishing is the lavatory equipment. The cleanest arrangement is a porcelain hopper or sink with detachable basins made of plated copper or solid nickel, for these

* For this purpose a beautiful new 'lacquered paint' is made by Messrs. Flicoteaux, 83, Rue de Bac, Paris, which gives a porcelain surface, is capable of being scratched without detriment, and is thoroughly aseptic.

PLATE V.

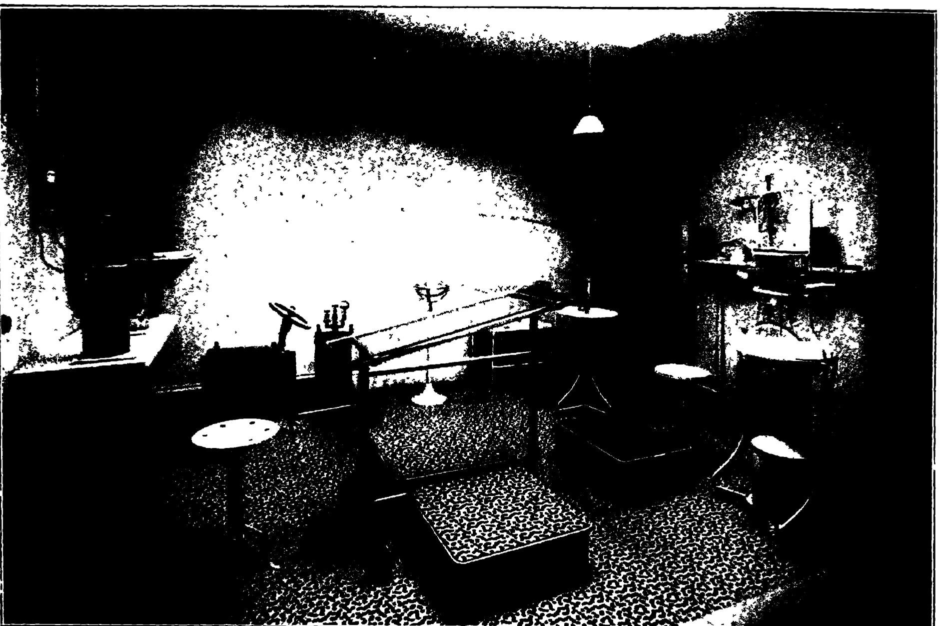




New Operation Room—Two Views. (Author.)

[To face p. 118.

PLATE VI.



PREVIOUS INSTALLATION. (Author.)

[*To face p.* 119.

can be sterilized; and by this means there is no possibility of coating with grease or accumulation of blood and other organic discharges. The traps in the pipes must be seen to frequently. Hot and cold water should be laid on, and if the cost be not a consideration, the taps can be turned on, and the waste plug lifted, by pedal arrangement. In addition, one or two portable lavabos may be used for rinsing and disinfecting the hands during an operation.

Plenty of sterilized water should always be available. Without special apparatus this can be obtained by boiling water for half an hour and allowing it to stand in covered vessels for a longer or shorter time according to the temperature required. Or if large quantities are likely to be used, a special apparatus may be employed, such as a copper reservoir lined with a steam coil connected with a boiler.

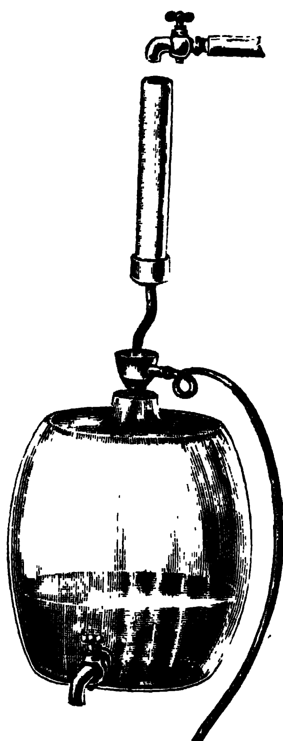


FIG. 99. — CHAMBERLAND-PASTEUR FILTER, AS USED BY AUTHOR.

PRIVATE INSTALLATION. — 1. I may here describe my own installation at the "home" in which I operate.* The room was thoroughly prepared for the porcelain paint to which I have referred, and with which it and the doors leading to it were entirely covered. All the shelves have the same coating. The cupboard off the room is used for the surgeon's clothes, overalls, jackets, aprons, small blankets for the patient, and various bandages.

Directly over the table is suspended an electric lamp with reflector, capable of throwing a 200-candle light on to the patient. This is readily raised or lowered by pulley action. The room is otherwise lighted by electricity. It contains the vapour and dry sterilizers, and a

* If any are desirous of seeing the other plans for the installation of perfect operating-rooms in private institutions, they will find all they require in Doyen's 'Technique Chirurgicale' (Paris: Masson & Co., 120, Boulevard St. Germain), in which there is a complete description of the operating-rooms and their annexes of his cliniques at Rheims and Paris. (See also the drawings of various installations in Messrs. Flicoteaux's catalogue.)

boiler, used for the supply of hot water which has been previously filtered through the Chamberland-Pasteur filter. In it are also the movable *lavabos*, which can be readily rolled from place to place. One contains sterilized water for douching, and the litre-marked funnel jar for the use of sterilized serum, should such be required in emergency during or immediately after operation. This serum is made by adding 7 parts of chloride of sodium to the 1000, and the needle used is that shown in Fig. 104. This is introduced into the subcutaneous tissue under the mammary gland,

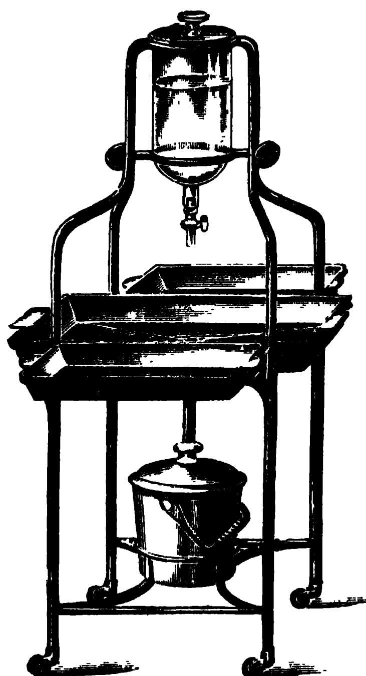


Fig. 100.—Lavabo (No. 2) for Instruments.

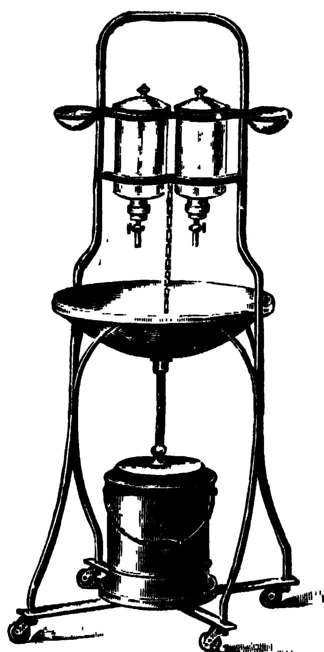


Fig. 101.—Movable Lavabo (No. 3) to place near the Operator.

and about a litre of the fluid is allowed to flow subcutaneously in cases of threatened collapse from hæmorrhage or shock. The serum should be sterilized at 130°, and injected subcutaneously in a dose of from 50 to 200 grammes as often as twice or three times in the day, or even more frequently in grave cases.*

No. 2 holds the trays for the instruments used in operating, and

* Full instructions for the subcutaneous injection of artificial serum are given in the chapter on the operative treatment of fibro-myoma.

is generally large enough to accommodate the glass boxes containing the various sutures and ligatures. The second assistant, standing opposite the operator, has this stand at his side. He hands all the instruments as they are required, as well as the ligatures, cut straight from the reels, and he threads the needles. He is thus

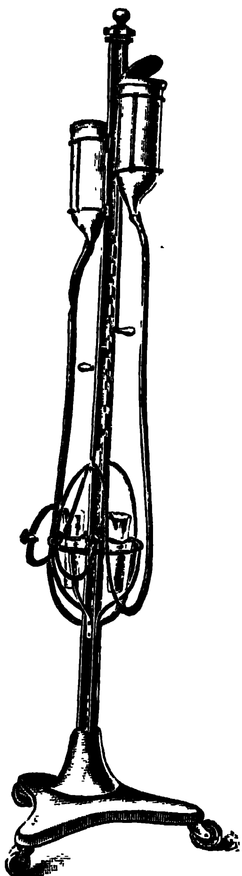


FIG. 102.—LAVABO (NO. 1) FOR SERUM, AND DOUCHE.

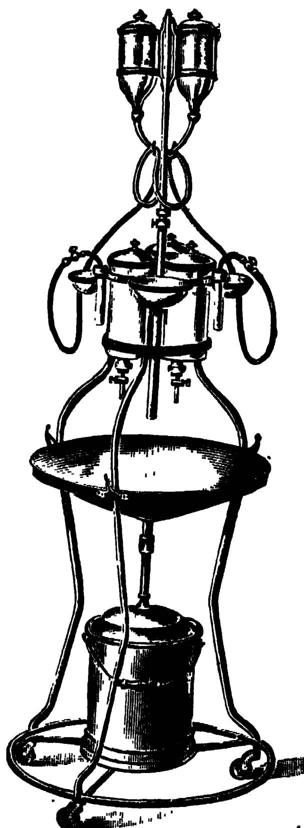


FIG. 103.—LAVABO FOR WASHING THE HANDS, AND ALSO FOR DOUCHING, ETC.

placed a little behind and to the side of the principal assistant, who is directly opposite the operator. No. 3 lavabo is placed behind and to the side of the operator. The jars contain sterilized water, which is useful for cleansing the hands during the operation. In it also the hands may be finally rinsed with running sterilized

water, and the last washing given by the operator and assistant with the mercuric and alcohol solution.

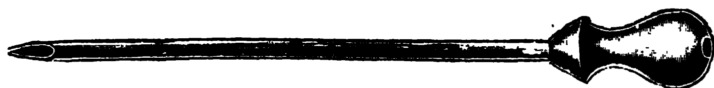


FIG. 104.—NEEDLE FOR ARTIFICIAL SERUM.

I am in the habit of burning a formalin lamp, the "*Alformant*," in the room for several hours the evening before operation, and the

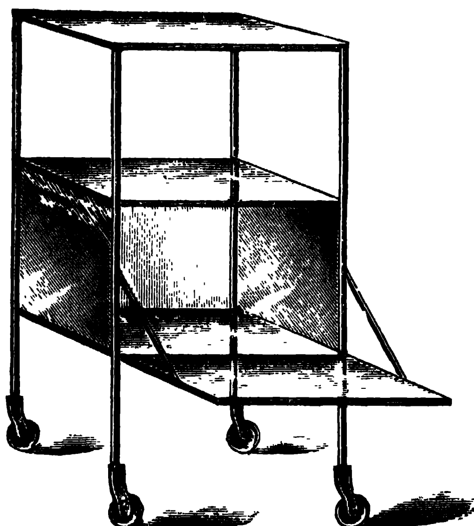


FIG. 105.—MOVABLE STAND FOR INSTRUMENTS.

same means is used to disinfect the closet in which the clothes are kept.*

OPERATIONS PERFORMED IN A PRIVATE HOUSE.

From what I have said I think it is manifest that, with the facilities we now possess of carrying about with us in a properly constructed bag everything perfectly sterilized that can by possibility be required for an operation, if we have an intelligent

* This lamp, with the tablets for burning in it, can be had of the Formalin Hygienic Company. For air-sterilization, 1 tablet in 1000 cubic feet; for disinfection, 10 tablets in 1000 cubic feet.—*Vide* p. 44.

Mr. Exham Phillips, of the Hospital Engineering Company, John Dalton Street, Manchester, has devised an admirable steam disinfector for clothes and clothing, etc., the medium size of which is adaptable to cottage hospitals, private homes, etc.

assistant, conversant with the aseptic methods, we can fulfil most of the conditions that are demanded of us. Clearing a room of all superfluous furniture and draperies, as well as carpets, or other sources of infection, we can in a few hours have all the woodwork thoroughly scrubbed, and the room disinfected. The Alformant lamp (Fig. 130) enables to do the latter thoroughly, without injury to any surrounding materials, within a period of twelve hours.

Perhaps the most dangerous element in an operating-room is the uneducated or careless nurse. We are more likely to have to face this risk in the private house than elsewhere. Infection from hands, clothes, incautious handling of the patient or of soiled clothing, infectious wounds of the fingers, the presence of a cold in the head

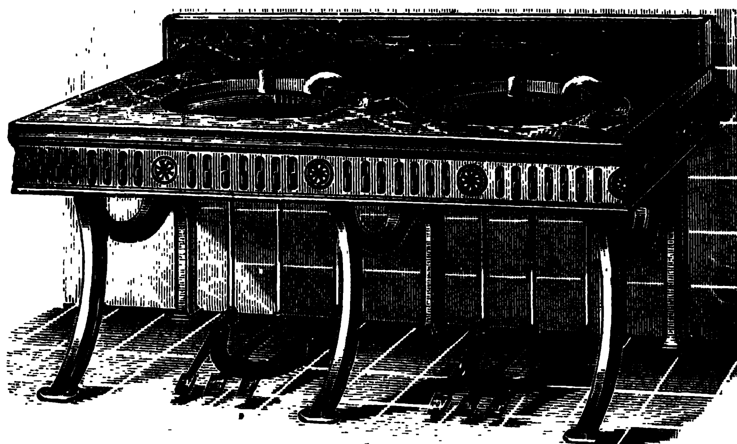


FIG. 106.—PERMANENT WASHSTAND FOR HOT AND COLD WATER, WORKED BY FOOT PEDALS.

necessitating the use of handkerchiefs, are all loopholes for the admission of contamination. It is always better to make the most careful selection of the nurse or nurses who directly assist, and never to permit any nurse who prepares the patient, or places her on the table, to assist in operation unless there has been the most rigorous subsequent disinfection secured before any instruments or appliances are handled.

In any " home " or private house, the operating-room should be as far as possible removed from a lavatory or housemaid's closet, and the most careful disinfection of these should be secured if they are near the room in which the patient sleeps after operation.*

* Chinosol is an excellent disinfectant for closet use, and to disinfect the stools.

ESSENTIALS IN THE ROOM.—Everything needful for an operation should be in the room before it commences, and there should be no necessity for any one to leave the apartment while it is proceeding. In any private house there ought to be in readiness for the surgeon—

A few small buckets or pails.

Sufficient basins.

The disinfectant solutions.

Bottles of perchloride of mercury and absolute alcohol.

Arrangements for supply of boiled and hot water.

A supply of towels.

Small blankets.

A hypodermic needle with tablets of strychnine.

Some flannel bandages.

Irrigation-douche with tube and nozzle.

Two rubber sheets.

A suitable table which has been well scrubbed with disinfectant.

Small table for anæsthetist's instruments.

Small tables for separate basins for the rinsing of the operator's and assistants' hands.

Restoratives, kept together, and apart, for use in emergency.

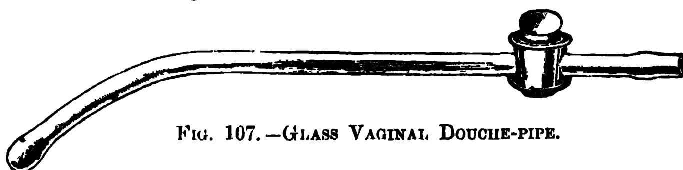


FIG. 107.—GLASS VAGINAL DOUCHE-PIPE.



FIG. 108.—GLASS PIPETTE FOR ATTACHING TO TUBE FOR ASSISTANT'S USE IN VAGINAL OPERATIONS.*

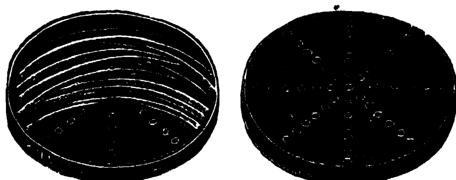


FIG. 109.—NICKEL BOX FOR STERILIZING NEEDLES.

STERILIZATION OF APPLIANCES AND DRESSINGS.—In any aseptic

* See also vulcanite pipette with special top, p. 142.

operation the following articles have to be sterilized : instruments, compresses, tampon sponges, gauze, ligature silk, silver wire, drains, and drainage-tubes.

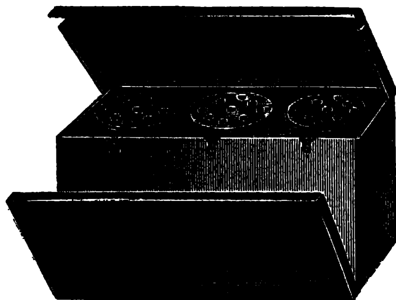


FIG. 110.—STERILIZER WITH REELS FOR SILK.

There are a few simple facts with regard to sterilization which have to be remembered. Bacteria do not survive a temperature from 120° to 180° C., and the spores of bacteria are destroyed by lower temperatures than these when they are submitted to air which is saturated with the vapour of water, while at even lower temperatures still—say 100° C.—micro-organisms succumb if the temperature be maintained for a sufficient time, and repeated by successive sterilizations.

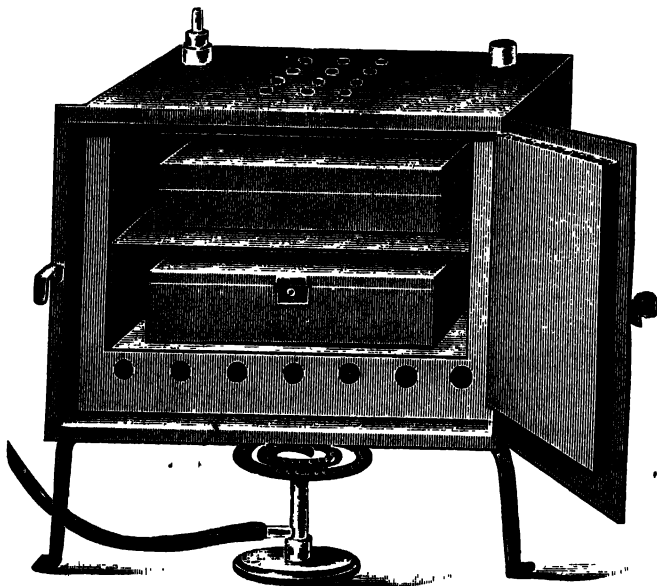


FIG. 111.—DRY STOVE AS USED BY AUTHOR.

The dry stove I employ for sterilizing instruments is that of Poupinel, made by Lequeux (Maison Wiesnegg, 64, Rue Gay-lussac,

Paris); it is a small model of that used by Doyen. It contains air-tight copper or nickel boxes for the instruments. The temperature in this stove rises from 150° to 160°, and the sterilization lasts for one hour. I use Chamberland's *autoclave*, or vapour-stove, for the sterilization of the dressings, compresses, mops, dabs, etc.* In this stove can be placed two air-tight nickel bottles or boxes containing the various articles to be sterilized. Such are portable, and can be carried by the surgeon in going any distance to an operation. The dressings, previously moistened with water, not too tightly pressed in the nickel box, are subjected to a temperature of 140°. After sterilization they are moist, to which there is no objection. One hundred and twenty degrees of heat is sufficient for the sterilization of the silk ligatures, as a greater degree of heat is apt to injure them. The silk may be rolled on glass or nickel reels, wrapped in gauze, and placed, moistened with water, in a nickel bottle. *Such silk serves only for one operation.*

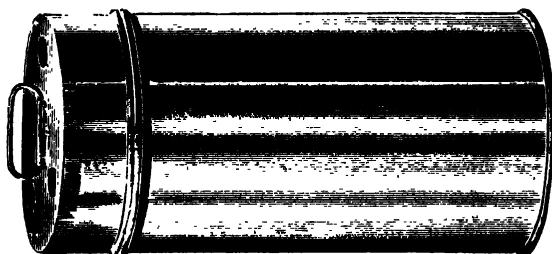


FIG. 112.—NICKEL BOX FOR PLACING IN THE VAPOUR STERILIZER.

Sterilization of Gut. — For the sterilization of catgut † the method I have adopted is that employed by Frau Horn in Dr. A. Martin's *klinik*. The catgut is laid on flat glass plates and placed for six hours in a $\frac{1}{1000}$ solution of corrosive sublimate (without alcohol), so that the catgut is well covered by the solution. It is then taken out and placed for twelve hours in a solution composed

* The pads used instead of sponges are made of absorbent wool enclosed in gauze. Dabs are cut in squares from butter muslin; thicker squares of the same or of fine *toile* are used for protecting the skin, the edges of the wound, and the intestines.

† Thoroughly reliable gut of every size, as used by Profs. Bergmann, Olshausen, and Martin, may be had (with full instructions for its sterilization) of M. Boehme, 54, Orienburger Str., Berlin. Glass reels, and all the necessary appliances for silk and gut sterilization, can be had of these makers. Southall Bros., of Birmingham, make two sizes of gauze pads. These can be sterilized in quantity, and form admirable compresses and dabs. They have the advantage of cheapness, being only 10*s*. and 14*s*. per gross, according to size.

of two parts of the best alcohol and one part of oil of juniper. It is then transferred to some of the same solution, but *newly prepared*, and kept in this till required; but it must so remain at least fourteen days before it can be used. Should any fatty matter appear on the top, it must be carefully removed with a spoon. I transfer



FIG. 113.—STOVE SUITABLE FOR OPERATING THEATRE AND LARGER INSTALLATION. In this stove the boxes of instruments, the serviettes, compresses, aprons, and wearing apparel can be sterilized, and the instruments being kept in these hermetically closed boxes, they can be taken from place to place with the sterilized dressings for use in emergency.

the gut to absolute alcohol, and allow it to remain for six weeks in this, changing occasionally before using it.*

* As a matter of fact, all the gut used by me has been in alcohol after preparation for over one year.

Silk.—The following is the method of sterilizing silk employed by Dr. W. S. Halsted, of the Johns Hopkins' Hospital, and it is that pursued by me. The skeins of silk are opened and cut in lengths of 40 centimetres (16 inches) for carriers, and 24 to 30 centimetres (9 to 12 inches) for ligatures and sutures. Some of these are wound on a glass reel; and a few such, of assorted sizes, are dropped into

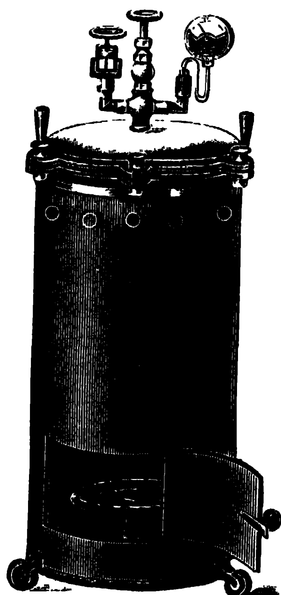


FIG. 114.—CHAMBERLAND'S AUTOCLAVE FOR VAPOUR STERILIZATION OF DRESSINGS, COMPRESSES, ETC. At two kilogrammes of pressure the temperature reaches 134°. The dressings are kept in for three-quarters of an hour at 120° in the open nickel boxes which can be closed air-tight; a stove to hold six such bottles can be had.

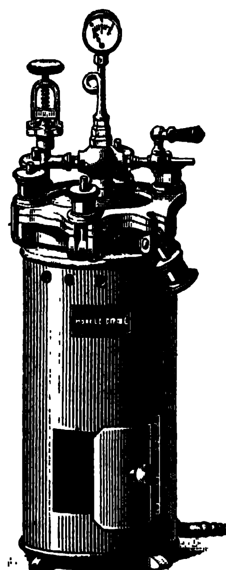


FIG. 115.—VAPOUR STERILIZER AS USED BY AUTHOR.

a stout glass ignition-tube devised for this purpose. Several of these tubes, plugged loosely with cotton, are put into a steam sterilizer for an hour the first day, and on the two following days for half an hour each time. The steam passes through the cotton without restraint, and acts upon the silk as easily as if it lay loose in the sterilizer. On removing the tubes the cotton in the mouth is pushed tightly in, and they are stored away in glass jars until wanted. Silk which remains over after an operation may be

resterilized in the same way, but it is apt to be weakened after the second sterilization. I find the hermetically closed glass jars of Leiter admirable for preserving the silk.

Bergmann, of Berlin, places the catgut in 1 per cent. sublimate solution and 80 per cent. of alcohol. It is left for at least 48 hours.

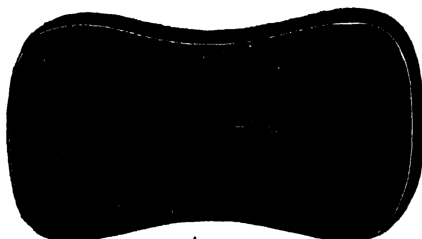


FIG. 116.—GLASS REEL TO KEEP GUT IN SOLUTION.

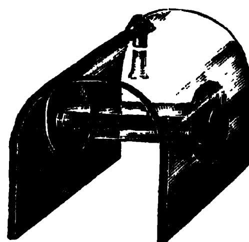
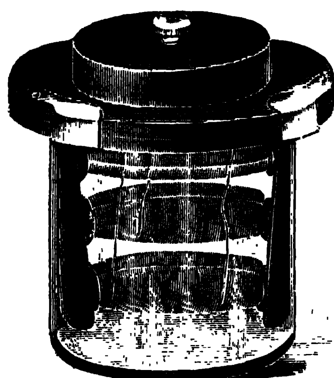


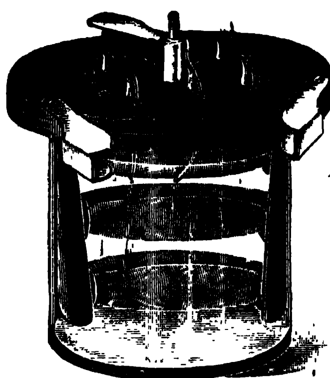
FIG. 117.—GLASS REEL FOR SILK.

This immersion is renewed in fresh solution every few days until the fluid is quite clear; then the gut is kept in ordinary alcohol.

Hofmeister, of Tübingen, proceeds as follows: The raw catgut is wound without any preparation on strong glass plates or reels, so



Closed.



Open for use.

FIG. 118.—LEITER'S HERMETICALLY CLOSED VULCANITE AND GLASS JAR FOR SIX SILK REELS, CONTAINING SIX DIFFERENT SIZES OF SILK.

that each thread lies next to the other. The thread must be carefully and tightly wound, and the ends are best knotted. The rolled-up catgut is then placed—

1. For 12 to 48 hours in a 2 to 4 per cent. formalin solution.

2. In running water for 12 hours, to get rid of the superfluous formalin.

3. It is boiled in water for 10 to 20 minutes.

4. It is hardened and kept in a mixture of absolute alcohol, with 5 per cent. of glycerine, and either 4 per cent. carbolic acid or 1 per cent. corrosive sublimate.

These are Howard Kelly's directions for the preparation of silkworm gut, and sponges, and iodoform gauze.*

Silkworm Gut.—To sterilize silkworm gut, a dozen pieces or more are loosely twisted together, doubled, and put into an ignition-tube or a piece of ignition glass tubing plugged at both ends, and sterilized in the same way as the silk.

Catgut.—1. Cut the catgut into the desired lengths, and wind 12 strands into a figure-of-eight form, so that it may be slipped into a large test-tube.



FIG. 119.—GLASS NEEDLE-CASE FOR KEEPING STERILIZED NEEDLES.

2. Bring the catgut gradually up to a temperature of 80° C., and hold at this point one hour.

3. Place the catgut in cumol, which must not be above a temperature of 100° C.; raise to 165° C., and hold at this point for one hour.

4. Pour off the cumol, and either allow the heat of the sand-bath to dry the catgut or transfer it to a hot-air oven, at a temperature of 100° C. for two hours.

5. Transfer the rings with sterile forceps to test-tubes previously sterilized as in the laboratory.

Sponges.—The difficulty in thoroughly sterilizing sponges has, I think rightly, led to the rejection of them by most surgeons. At the same time, if we can secure such sterilization a sponge is the best and most absorptive material we can use. No matter how guaranteed by a chemist or instrument-maker, the surgeon should

* 'Operative Gynæcology,' vol. i. (Appleton & Co., New York, 1898.)

himself secure the purity of the sponge before he uses it. The prepared and compressed sponges sold by most instrument-makers, when soaked in boiling water and placed for some hours in a five per cent. solution of carbolic acid, are among the best. At least, the precautions of soaking every newly purchased sponge in boiling water, and, after it has lain in it for some time, allowing it to lie for a few hours in a strong carbolic or perchloride solution, should be observed. A perfect sponge is of that size to be grasped conveniently in the fingers, and to absorb a sufficient quantity of fluid. Those sold are often too small. They should not be too porous nor readily tearable, neither should they feel hard, coarse, or rough. The sponge should be complete in itself.

In Johns Hopkins Hospital the process followed for preparing sponges is as follows:—

'1. Lay them in a stout cloth and pound sufficiently to break up grit and lime.

'2. Rinse with warm water ten or more times until it remains clear.

'3. Immerse in a muriatic acid solution, 15 cubic centimetres to 1 litre (ʒ ij to o j.), for twenty-four hours.

'4. Immerse in saturated warm permanganate of potash solution.

'5. Decolourize in a hot saturated oxalic acid solution.

'6. Pass through lime-water to take out all the oxalic acid.

'7. Rinse thoroughly in plain sterilized water.

'8. Immerse in a 1 in 1000 solution of bichloride of mercury for twenty-four hours.

'9. Preserve, until used, in a 3 per cent. carbolic acid solution.'

'The hands manipulating the sponges during these preparations, from step 4 on, must be sterile, and much of the manipulation may be done with instruments.

'When wanted for use the sponges are lifted out with a long pair of sterilized forceps and rinsed in sterilized water. I never use the same sponge twice, although this may be safely done after aseptic operations.

'The best substitute for a sponge is Berlin wool made into a small ball and covered with gauze, which can be sterilized in the ordinary way in the steam sterilizer. Another good substitute for sponges is small gauze mops, made by cutting gauze into convenient strips and rolling them into small balls; a sufficient quantity of these sponges can be prepared before operation by the nurse, and stored in linen bags and sterilized by the fractional method.'

'In operations in private houses, where the water-supply is questionable, the so-called dry technique, in which dry gauze and sponges are used instead of water, is decidedly safer.'

'*Iodoform Gauze* is prepared (with aseptic hands) by rolling plain sterilized gauze in 3-metre (about 3-yard) lengths, and then cutting up the roll into different lengths and breadths to meet the various requirements.

'Before dividing the large roll into these smaller pieces, it is saturated with the following iodoform mixture: To 180 cubic centimetres (6 ounces) of warm water, made into a good suds with Castile soap, add 45 cubic centimetres (an ounce and a half) of powdered iodoform, and mix it well in a clean basin with a glass

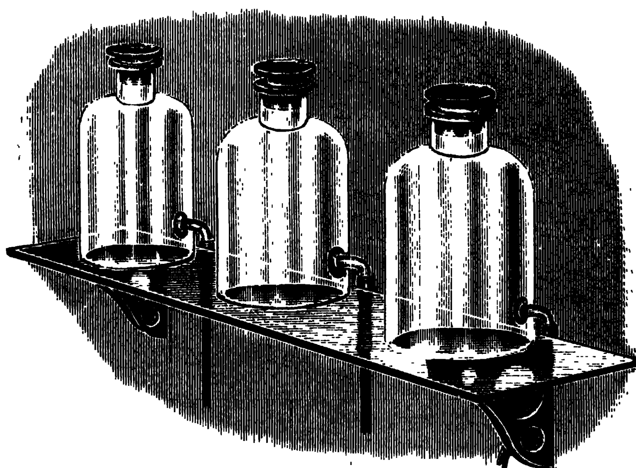


FIG. 120.—JARS ON SHELF FOR MERCURIC, FORMALIN, AND CHINOSOL SOLUTIONS.

rod. Then immerse the roll of gauze in the liquid, and work it with the hands until the iodoform has been completely taken up into the meshes of the roll. This is now sterilized three times in the steam sterilizer.'

Drainage-tubes are best treated by placing them in the sterilizer used for the dressings. When taken out they can be kept in carbolic acid solution 5 per cent. Just before use they should be washed in sterilized water and transferred to a 2 per cent. formalin solution. Glass drainage-tubes are placed with the instruments in the dry sterilizer.*

* I have seen some ingenious air-tight aseptic containers for medicated bandages, dressings, and gauzes, as well as aseptic ligatures of various lengths

PREPARATION OF THE SURGEON AND HIS ASSISTANTS.

The requirements of ordinary cleanliness, such as frequent bathing, changes of underlinen, etc., are naturally stringently binding on the surgeon, but they are not all he has to consider. For operating he should be dressed in a clean, preferably sterilized, suit, or jacket and apron, and the arms should be bare from well above the elbows

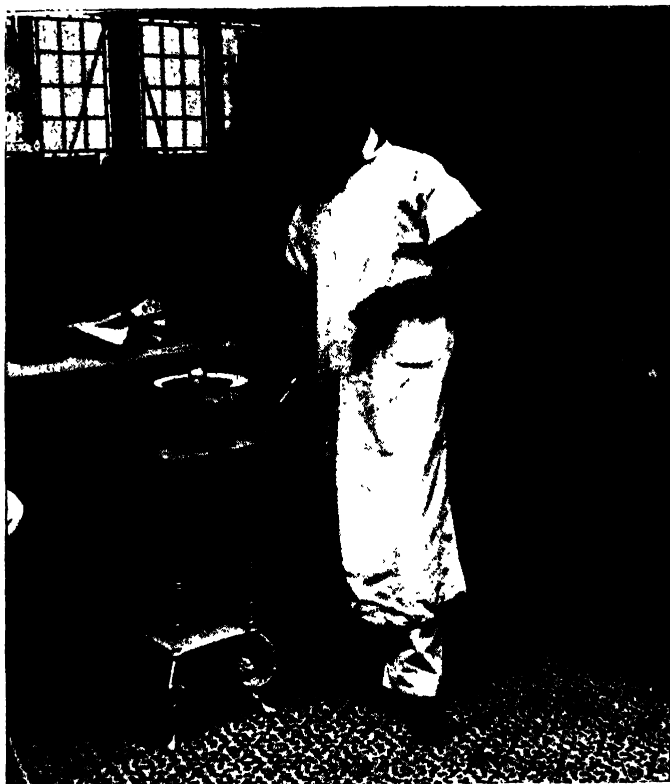


FIG. 121.—ASSISTANT READY FOR OPERATION.

downwards. The same remark applies to his assistants. Nurses should wear a clean linen over-all apron, and have their arms bare. For the proper disinfection of the hands of operator, assistants, and nurses, minute precautions are necessary.

prepared in sterilized capsules, heated in cumol at a temperature of 330° Fahrenheit. They certainly have the advantage of portability, and are guaranteed to resist any bacteriological test. These containers and dressings are made by Messrs. Seabury and Johnson.

1. 'Staphylococci,' says Kelly, 'are present on the hands of all persons.'

'2. It is impossible to get rid of these organisms, even by scrubbing the hands and nails from ten to twenty-five minutes with a sterilized brush, soap, and water at a temperature of 40° C.

'3. The bichloride of mercury solutions as used, up to 1 in 500, are not so germicidal as supposed, but they are inhibitory, as

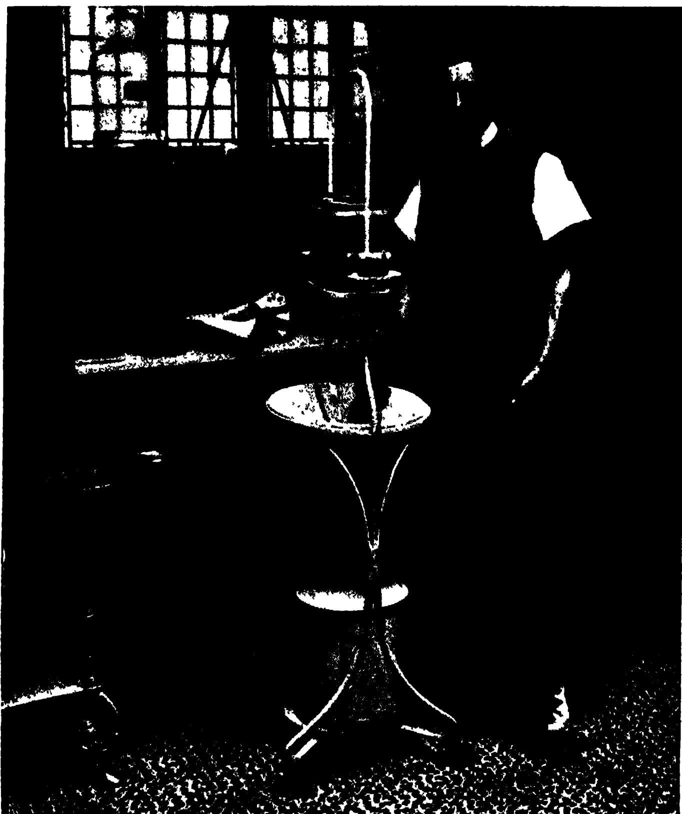


FIG. 122.—SURGEON WITH OVERALLS AND WATERPROOF APRON PREPARED FOR OPERATION.

demonstrated by cultures growing after the precipitation of the bichloride with ammonium sulphide" (Geppert).

As to the surgeon's, assistants' and nurses' arms and hands, it may be safely said that it takes *at the very least ten minutes' time* to prepare these. Preferably, they should be washed (*from above the*

elbows down) under a tap of running water, and with antiseptic soap. The nail-brushes should be kept always in antiseptic fluid in air-tight glass boxes (which are now easily obtainable), or, as I prefer, in glass boxes, to the covers of which they are screwed, being thus constantly soaked in the antiseptic. The glass cover thus forms the back of the brush. The arms should be several times well soaped as well as the hands, the nails closely pared,



FIG. 123.—SURGEON WITH OVERALLS.

subjected to repeated cleansings, and the arms and hands both finally scrubbed over with 1 in 1000 sublimate solution. *Then the hands, wrists, and arms are pressed down and kept for a few minutes in a basin of equal parts of a sublimate solution,* 1 *in* 1000, *and absolute*

*alcohol, which solution is also carried over the arms.** The hands of the operator, his immediate assistant, the overseer of the instruments and ligatures, or those of any nurse who may have to handle instruments, sponges, or dressings, should be prepared with equal care. There should also be, at the side of the operator, a small washstand, or preferably a movable *lavabo* on castors, which has two jars provided with taps, containing sterilized water, in which his hands can be rinsed from time to time during the operation.

Some surgeons prefer the permanganate of potash and oxalic-acid method of disinfecting the hands. The efficacy of the method was tested by Drs. Ghriskey and Robb at the Johns Hopkins Hospital.

'At the time these experiments were conducted,' says Howard Kelly, 'it was believed that the permanganate of potassium was the active germicidal agent, the oxalic acid being used simply to neutralize and decolourize the permanganate of potassium.

'A series of experiments by Dr. Mary Sherwood, conducted in 1893, at my request, to determine the relative part played by these two chemicals in the process of disinfection, however, led to the conclusion that both the permanganate of potassium and oxalic acid were germicides, but that the oxalic acid, at a temperature of about 40° C., is a much more powerful germicide than permanganate of potassium.†

'The strong evidence furnished by these two series of experiments as to the efficacy of the permanganate and oxalic acid as disinfectants is further sustained by an extended practical experience.'

Pads of sterilized gauze, 15 centimetres (6 inches) square, are useful in enabling assistants and nurses to touch handles and lids of jars, etc., without contamination.

Preparation of the Patient.

This should be entrusted to an experienced and careful nurse, and consists of previous bathing of the patient, free washing of her body with soap, thorough scrubbing of the part to be operated upon, and covering it with dressings wet with an antiseptic solution. In *vaginal operations*, previous antiseptic douchings of the vagina, followed by the insertion of antiseptic tampons, are the principal means to be employed. Wherever it is

* This rinsing had better be repeated several times.

† (See 'Johns Hopkins Hospital Reports,' vol. iii., p. 359).

possible, these steps should be carried out in a separate room, and in it the patient should be carefully shaved *before* being brought into the operating-room. This shaving of the patient should be thoroughly done, and after the part has been denuded of hair it should be covered

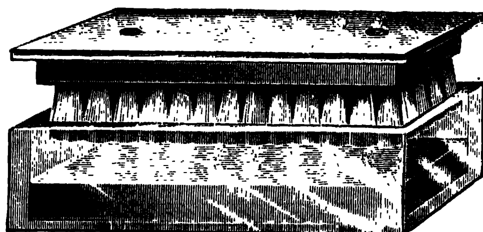


FIG. 124.—ASEPTIC NAIL-BRUSH WITH BOX.

by a good lather of soap, and washed by the antiseptic. We *must* insist that when the patient is placed in the position necessary for, say, vaginal hysterectomy, and the external parts have been thoroughly shaved, washed, and cleansed, the *last* step should be

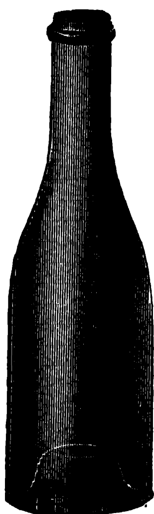


FIG. 125.—PINT BOTTLE USED FOR VAGINAL DOUCHING.

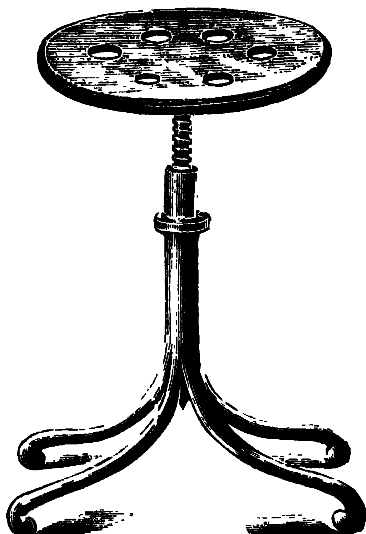


FIG. 126.—ASEPTIC OPERATING-STOVE.

sterilization of the vagina, and this can be best achieved by opening the vulvar orifice well with two fingers depressing the perinæum, while we thoroughly soap and repeatedly douche out the vagina with an antiseptic fluid. I now frequently adopt A. Martin's plan of

douching out the vagina (when this has been well opened by fingers or retractors) with sterilized water from a pint champagne bottle, two of which are kept ready filled for the purpose. A nurse or assistant can do this from time to time during an operation as required. As little of the surface of the body as is possible should be exposed for the performance of an operation. All the surrounding parts should be covered with flat compresses which have been antiseptically prepared, or have been sterilized previously, and then wetted with sterilized water. Such sterilized cloths are not applied until the skin has been finally washed with a solution of equal parts of absolute alcohol and 1 in 1000 of perchloride of mercury, followed by a final rubbing of sterilized wool saturated with ether. No nurse or assistant whose hands and arms have not been prepared should take part in any of these manipulations; and if, through accident, one should happen to handle or touch anything which has not been rendered aseptic, the hands should be again rinsed in the solution of alcohol and sublimate.* I cannot too emphatically press on all who in any way assist in an aseptic operation, the close attention that the nails demand. No gynæcological surgeon should have a projecting finger nail. In all operating-rooms there should be sterilized nail-files and nail-shears or scissors. After the first washing of the hands, the nails should be carefully attended to before the final ablution. It is also necessary to insist upon all assistants preparing the arms and hands with an overall on, *not, as is often done, before the ordinary clothes are covered.*

PRECAUTIONS REGARDING NURSES.—Two nurses are placed a little behind and to the operator's right, one for the immediate passing of sponges, dabs, and tampons, as well as any sterilized towels, or, if required, cloths wet with antiseptic solution. The second nurse passes to her all such fresh gauze or other dressings, and, if ordinary sponges are used, she sees to the rinsing and return of these. *Neither of these nurses should, before final sterilization of the hands and arms, touch anything in the shape of an instrument, appliance, sponge, cloth, or dressing used in the operation.* Should only two nurses be available, the nurse who places the patient on the table, and sees to the arrangement of the clothes and coverings, should finally sterilize both hands and arms before taking her place at the operation. In the room also are kept drainage-tubes, which have been sterilized in 5 per cent. phenol solutions, jars

* All necessary overalls and aprons can be had ready made of Messrs. Bohme, 54, Orienberger Strasse, Berlin, and M. Turinsky, Garrison Strasse, Vienna.

containing mercuric gut, the various dressings and other necessaries for operations ready for sterilization.

The rules I insist on for nurses are as follows :—

Rules observed by the Nurses previous to and during Operation— Antiseptic Nurse.—The nurse prepares the patient, as instructed, on the morning of the operation. She sees to the shaving, washing, and disinfection of the case, and the bringing of the patient into the operating-room. She sees to the arrangement of her clothes when on the table. She does not touch, from first to last, anything, whether instrument, sponge, compress, or dressing, which is used in the operation.

This nurse sees to the different aprons and overalls for the doctors, she stands by during the operation, but does not take part in any manipulation concerned with the operation itself, or the appliances. This rule is never infringed.

Aseptic Nurses.—Nurse No. 1 is responsible for the previous sterilization of everything which is used, or that may be required to be used, during an operation. She is careful that nothing which has not been sterilized can possibly come within reach of the operator or assistants. She takes charge of, and hands directly, all sponges or compresses to the operator or assistant, standing immediately behind him. If ordinary sponges are at any time used, she passes these directly to the second nurse for rinsing and returning. She sees to the counting of sponges and torsion forceps.

Nurse No. 2 stands near No. 1, and is ready to assist with sponges and irrigator, or anything that may be directly required in the operation itself. No nurse taking a direct part in the operation is, during its progress, to pick up anything dropped on the floor. No nurse is to take part in an operation who has any infectious wound or sore on the hand, or who suffers from cold in the head.

After the hands and nails of the two nurses assisting have been rendered thoroughly aseptic, they must not touch anything which has not been sterilized.

One nurse assists immediately after the operation in the cleansing and drying of the instruments, and all instruments used are to be thoroughly cleansed before they are placed in the bag or case.

OPERATION AND ABDOMINAL TOILET.*

As little of the surface of the part to be operated upon as is possible is exposed before the first incision is made. For example,

* See, also, p. 141.

in oöphorectomy or removal of the appendix it is not necessary to bare more than a few inches, the needful space being left uncovered by placing the small aseptic cloths, taken straight from the sterilizer, around the area of the wound. Or the abdomen may be covered with a sterilized cloth wrung out of antiseptic solution, with an aperture of the necessary size cut for the proposed operation. All the compresses and gauze dressings, as well as the sponges, are in like manner taken straight from the boxes, and are brought into the operating-room as they have been taken from the sterilizer, and these compresses and dressings are alone used (without any disinfectant) for hæmostasis, for tampons, the exclusion of the intestines, and the protection of organs and vessels. The compresses are easily caught with a catch forceps, which is thrown over the edge of the wound so as to facilitate removal. As to the substance used for ligatures, choice may vary, but as a rule I use fine silk for the peritoneum, catgut for the fascia and muscle, and silkworm gut for suturing the integument. When the operation has been concluded and hæmostasis secured, the entire wound is thoroughly cleansed with the sterilized compresses, fresh ones being used to absorb any oozing, as also to facilitate the pressure or ligature of any small vessels that may continue to give trouble. Hot sterilized water is sufficient should any irrigation or washing of the wound be necessary, and if the tampon has to be resorted to, sterilized gauze is employed. Doyen holds that the *crin de Florence* is preferable to any other form of suture for the skin, on account of its solidity and its toleration by the tissues.

In true aseptic operations drainage is seldom necessary, and can only be so when we fear bleeding or oozing within the wound, or when we wish to avoid a sero-sanguinolent collection of fluid. On the other hand, drainage becomes a necessity where we are dealing with septic conditions, and in those cases of laparotomy in which purulent fluid has been evacuated in the course of the operation, and, again, in such operations as vaginal hysterectomy. Take a classical example, oöphoro-salpingo-pan-hysterectomy for double pyosalpinx with adhesions. Here, after completely clearing the pelvic basin and thoroughly cleansing and drying it, sterilized gauze, or sterilized iodoform gauze, is passed through the vaginal opening into the vagina, which is then shut off from the pelvic cavity by sutures, and a stout rubber tube is carried through the abdominal wound, its other end being left in the pouch of Douglas. No idea of closing either the abdomen or vagina should be entertained as long as the

gauze is tinged with blood, or the least suspicion of bleeding remains.

When an operation has been thus completed, no one in its entire conduct, whose hands have not been prepared aseptically, having touched anything used during its performance from first to last, we may look upon it as a thoroughly aseptic operation. Over the strip of sterilized gauze which covers the wound, or, if some prefer, the sterilized iodoform gauze, the best covering is a large and thick compress of sterilized wool.

Asepsis in Vaginal Hysterectomy.

Sterilization of the Vagina.—In vaginal hysterectomy, when the patient is placed on the table, the thighs being separated by assistants or a crutch, the genitals, previously shaved, are thoroughly washed with repeated lavements of izal soap, and a good lather of the soap rubbed on the sponge is carried well round the vagina, which is thus repeatedly washed out and alternately douched with perchloride solution. Such a washing of the genitals and vagina should last for at least five minutes. Then the external genitals are sponged over with ether.

After vaginal hysterectomy, the iodoform gauze is unrolled off the sterilized bandages for the length of some three feet, and is carried through the vaginal opening to support the intestines. This is then cut and tied with silk, so as to indicate the peritoneal tampon; the vagina is now packed loosely but well with more iodoform gauze. These rolls, in the form of bandages about three inches wide, are sold in boxes containing some five or six yards, perfectly sterilized and hermetically closed.

The abdominal toilet is not made on the operating table. The bed of the patient is rolled into the theatre, and on it is the outer or other abdominal swathe. Over this is placed the inner domette binder, which serves to make the many-tailed bandage. The patient having been thoroughly dried, is raised on to the bed, iodoform gauze is placed over the wound, cotton-wool over this, and then the inner domette covering is applied in many-tailed fashion, and over all the outer swathe is pinned.

I am now using moist chinosol gauze 1 per cent. for subsequent vaginal dressings. It also makes an admirable covering for the abdominal wound. The tabloids are most convenient for making the solution for douching.

1 per cent. chinosol gauze is amply strong enough for the dressing

of wounds. Chinosol destroys the staphylococcus aur. pyogenes in five minutes in a solution 1 in 150. It is neither volatile nor hygroscopic.*

SUBSEQUENT DRESSINGS.—In many cases, for some days it is unnecessary to change the dressing when all is progressing satisfactorily. When any dressing is about to be conducted, the hands, both of surgeon and nurse, should be rendered aseptic. All dressings should be in readiness and close by the patient, while the

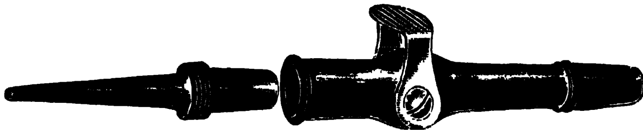


FIG. 127.—TAP WITH ADJUSTABLE NOZZLE WORKED WITH THUMB.

wound is exposed for as short a time as possible. The same remark applies to the removal of the skin sutures. I invariably use sterilized gauze, wet with a 1 to 2 per cent. formalin solution, to lay over the wound immediately it is exposed, while the new dressings are being applied.

ATTENTION TO THE VULVA AND VAGINA.—The vulva should be sponged daily with a formalin or chinosol solution, and, when necessary, the vagina should be douched with the same. After curettage

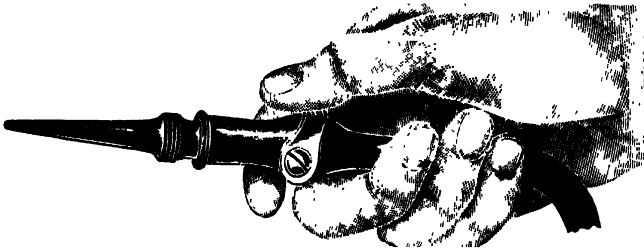


FIG. 128.—SHOWS THE WORKING OF THE TAP. Any shaped nozzle can be attached.

of the uterus—a step which I always carry out with every antiseptic precaution—when all bleeding is arrested and any application made to the interior of the uterus, the vagina is dried with aseptic pads, and some strips of iodoform or chinosol gauze are left in it. These

* *Chinosol Dressings* (B. Kühn, 36, St. Mary-at-Hill, London).—Chinosol gauze, 3 per cent.; chinosol gauze, 1 per cent.; chinosol wool, 3 per cent.; chinosol lint, 3 per cent.; chinosol tablets, 1 in O1 = 1 in 600.

I do not disturb until the expiration of forty-eight hours, when they are removed, and, after antiseptic douching, fresh ones inserted. These are then renewed daily for the first week after operation, after which the vagina is simply douched.

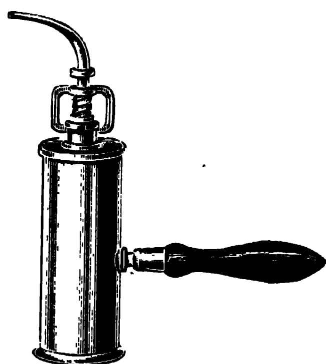


FIG. 129.—CATHETER STERILIZER.

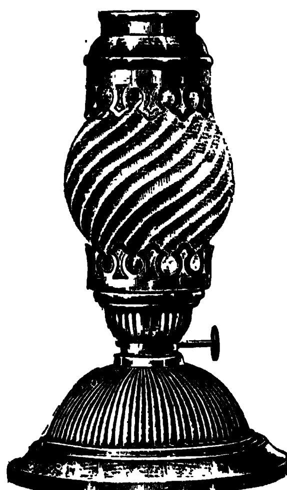


FIG. 130.—ALFORMANT LAMP.* (Formalin Hygienic Co.)

CATHETERS.—Two glass catheters should be in use in every case where the catheter is required. They should be sterilized after use, in a catheter sterilizer, and then placed in a 1 per cent. solution of formalin. If a sterilizer be not at hand, the catheter should



FIG. 131.—GLASS CATHETER.

be thoroughly washed in a 5 per cent. carbolic solution, and then placed in the formalin solution until it is required. Thus a freshly sterilized instrument is used each time.

* Alformant 'B' is made of brass and glass. It is capable of diffusing 20 to 25 tablets of paraform, or dry formalin, at a time. The spirit-container will hold about 8 ounces of methylated spirit, and permit nine or ten operations. The Alformant 'B' is sufficiently powerful for thorough disinfection. This lamp is used for the final disinfection of every room to be occupied by a patient, in the operating-room before operations, and for the surgeon's clothes'-closet.

Few Observations on Operation in the Patient's House.

General appliances required. These should be ready at least half an hour before operation.

Adhesive plaster.
Flannel bandages for the legs.
Leg crutches or leg rests.
Sterilized water and carbolic acid.
Perchloride solution of uniform strength.
Irrigation can and douche.
Sterilized absorbent wool.
Sterilized gauze.
Sterilized iodoform or chinosol gauze.
Absolute alcohol.
Sterilized gut and silk for ligatures and sutures.
Silver wire.
Drainage tubes and tubing--prepared and kept in 5 per cent. carbolic.
Safety-pins.
Sterilized blankets for lower extremities.
Bottle for boiled water.
A few small buckets.
A few cans for hot water.
A few large prepared sponges.
Sterilized dabs, gauze compresses, and small muslin protectors for the bowel.
Subcutaneous syringe.
Sulphuric ether.
Strychnine pellets for subcutaneous use.
Artificial serum and needle for injecting it, with sterilized water and tube, etc.

The dressings:
- Sterilized iodoform.
- Sterilized wool.
- Many-tailed binder.
- Outside binder.

Brandy.
Drinking-cup and spoon.

All preparations should be concealed from the patient, and if possible the anæsthetic should be administered in an adjoining room. When the patient is placed on the operating table, every

dressing and all appliances should be in their right places. The needles and ligatures are assorted, the accessory requisites are all placed, the small forcipressure forceps are counted. Each assistant and nurse is in his or her proper position. From this moment to the conclusion of the operation there should be no speaking, and only the operator's voice, in addressing his immediate assistant, should be heard.

On the previous night an aperient should be given to the patient. She then has a warm bath. The vagina is tamponnaded antiseptically. On the morning of the operation the abdomen and genitals are well washed with izal soap, and the hair is carefully shaved off. An

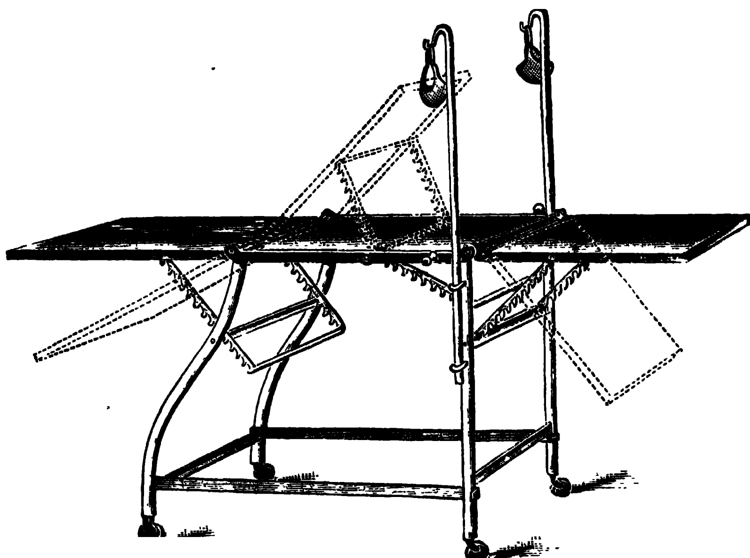


FIG. 132.—LIGHT PORTABLE OPERATING TABLE OF ARNOLD.

enema having been administered, the rectum is washed out with a saturated boric solution (30 in 1000). The vagina has been, in the manner described, rendered aseptic, and tamponned. The woman wears a loose but warm dressing-gown, and under this a flannel jacket. Her legs are swathed to well above the knees in flannel bandages, or warm white woollen stockings are worn. There should not be overcrowding in the operating-room, and younger operators should have few present save those required to actually assist. The operator should himself check off, some time before the operation begins, all appliances and instruments required with

the assistant who has charge of them. This assistant should take his stand with the instruments, sutures, and ligatures, a little way from the end of the table to the right-hand side of the operator, and his attention should not be distracted from the handing of each as it is required. He threads the needles, provides the ligatures, sees that soiled instruments are re-dipped in boiling water, and also to the removal of such as are no longer required.

In the same manner, the nurse who has charge of the sponges, dabs, compresses, etc., should have nothing else to attend to. If ordinary sponges be used, she hands these for rinsing to a second nurse, who returns them to her, and both are responsible for the accurate counting. Rarely, however, now are sponges employed, and the operator or his assistant throws under the table each dab or soiled compress as it is withdrawn. In the instance of muslin

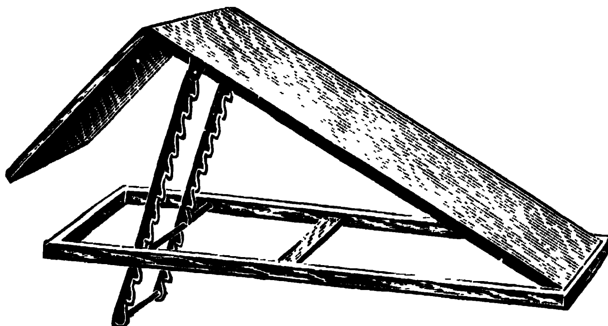


FIG. 133.—ADJUSTABLE FRAME FOR TRENDELENBERG'S POSITION.*

or other protectors for the bowel, these must be carefully counted, and it is safest to nip the end which is left protruding from the wound with a small clamp forceps to prevent its being left behind. These small squares when saturated with moisture shrink, and are apt to be concealed by coils of intestine, and to slip completely from view. The smaller dabs should always be used with a light clamp forceps, and these the assistant or nurse rapidly hands to the operator, giving the required size, large or small, according as is necessary.

BACTERIOLOGY.

More than a brief reference to the bacteriology of the female organs of generation is not possible, nor indeed would any lengthy description be desirable, as in the many admirable works on this

* See pp. 59-62, 145 and 151 for other operating-tables.

subject, and in the bacteriological laboratory by practical investigation, the student or practitioner alone can hope to obtain a clear and comprehensive mastery of this subject. But as in dealing with various inflammatory processes it will be necessary to refer by name to certain micro-organisms which are associated with them, and more particularly with those of a septicæmic nature, it may be well here to particularize those organisms which have more special influence on gynæcological surgery and practice.

1. *Döderlein's bacillus.*—It is now well known that Döderlein attributed a bacteriacidal influence to the vaginal secretion as long as it remained acid, which is its normal condition, and further, that this healthful influence was to be ascribed to an anaerobic bacillus which was easily cultivated on almost any media at 37° C. with 2 per cent. of glucose, or in hydrogen. Kroenig and Menge, however, described anaerobic non-pathogenic bacilli, which exist in the vagina and in its normal acid secretion, and are destructive of the pathogenic organisms. Their experiments would lead to the conclusion that in the vagina, with an unabraded mucous surface, we have, in its normal acid secretion, and in the naturally closed state, reliable germicidal forces at work. Taking these facts into consideration, with that of the closed canal of the cervix through its mucous, we see the provision made by nature against septicæmic processes in the genital tract.

2. *Staphylococcus Pyogenes Aureus.*—This micro-organism is frequently found in suppurative discharges, and is perhaps most commonly met with. It is generally found associated with other bacteria of the same group, and is more virulent than the staphylococcus pyogenes albus, or citreus. The staphylococcus pyogenes aureus occurs in masses of cocci in groups, more rarely singly, or in short chains.

3. *Streptococcus Pyogenes.*—The streptococci is another most virulent organism, its name being familiar to surgeons as associated with erysipelatous inflammation, peritonitis, and puerperal septicæmia. The cell elements of the streptococci are larger than those of the staphylococci, and occur in chains, either in groups or in single rows; and it would appear, from experiments such as those of Mamaroek and others, that the relative virulence of this organism may be due to its method of cultivation. It does not appear that bacteriologists have as yet satisfied themselves as to the various causes which influence the different forms of staphylococci and streptococci in their comparative and relative degrees of virulence. The practical

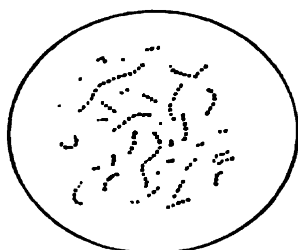
surgeon is ever mindful of the fact that where suppurative and septicæmic processes arise and spread, such origin and dissemination are found associated with their presence. He has also to realize that the danger arises from an inappreciable quantity of the infective material. A few germs are sufficient to produce the mischief and bring about such pathogenic conditions as will destroy life. It is many years since Koch showed that a trillionth part of a drop of dried septicæmic blood, taken from a mouse infected with anthrax, and preserved hermetrically for a considerable time, was sufficient when in solution to produce septicæmia in a healthy mouse. What amount of poison, then, a surgeon may carry in the handy receptacle of an unpared nail, those who would differentiate for us between the grosser and lesser degrees of septic material on the hands or person of an operator can best compute.

4. *Tubercle Bacilli.*—Now that primary tubercle of the uterus, Fallopian tube, and ovary has been proved to occur, and that tubercular disease has been shown to frequently invade both the uterus and adnexa, the isolation of the tubercle bacillus, and its recognition in the genital tract, is of supreme importance to the gynæcologist. This will have to be referred to several times in dealing with the question of tuberculosis. The morphological features of the tubercle bacillus are well known.

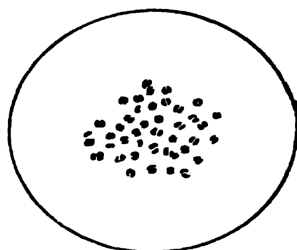
5. *Micrococcus Gonorrhœa, or the Gonococcus of Neisser.*—It is essential that every practitioner should know the characteristics of this organism. In shape it has been described as like two buns with their flat bases facing each other; but this arrangement of pairs, in double chain or otherwise, is not characteristic of this diplococcus, for others occur of the same shape in healthy vaginal mucous and in the lochia. Its occurrence in a purulent discharge, in such groups or colonies, *lying free between the pus cells, or lodged within the pus cell itself*, is its most characteristic feature. *It does not stain* by Gram's method. It requires a fresh blood medium, and a temperature of the blood, to grow. If the gonorrhœal pus be mixed with uncoagulated serum, and the mixture be added to two parts of melted agar, at a temperature of 40° to 45° C., and this be then allowed to solidify obliquely in the tube, the gonococcus will be cultivated.* Newman states that it is possible to sub-culture on ordinary media from such cultures. Other methods have been recommended, and will be found in text books on bacteriology. The lower animals do not take this disease by inoculation. The relation of the gonococcus

* *British Gynæcological Journal*, May, 1898.

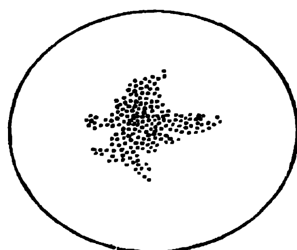
PLATE VII.



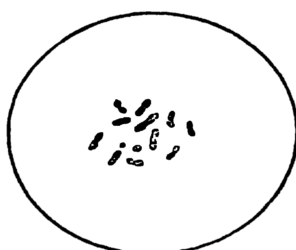
Streptococcus Pyogenes
(1 × 1000).



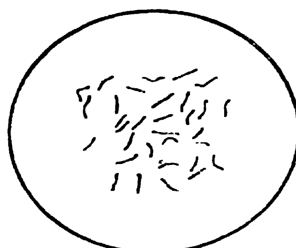
Gonococcus (Neisser)
(1 × 1000).



Staphylococcus Pyogenes
(1 × 1000)



B. Coli Communis
(1 × 1000).



B. Tuberculosis (1 × 1000).

[*To face p.* 148.

to pyo-salpinx, and the association of gonorrhœal infection with syphilis, and the relation of both to pelvic inflammations, will be referred to when we are dealing with these latter.

Bacillus Coli Communis.—This Bacillus is, as Hewlett observes, one of the most widely distributed organisms in nature, being aerobic, and facultative anaerobic. It is a short rod with rounded ends 2 or 3 millimetres long, and 0·4 to 0·6 millimetres broad, frequently linked in pairs or more. It varies somewhat in size and shape, is feebly motile, and possesses lateral flagellæ to the number of from two to ten. It occurs commonly in the intestinal tract of men and animals (Hewlett). It can be readily isolated and cultivated from fæces. It is known by several distinguishing morphological and culture peculiarities from the bacillus typhosus. Pathogenic in its action, it causes death when introduced into the circulation in variable periods of time, and has a toxæmic effect when introduced into the peritoneal cavity. Its chief interest to the gynæcologist lies in the fact that it is the organism of which he is most fearful as the cause of peritonitis when there has been any bowel infection, either primarily through traumatic causes in operation, or secondarily from infection from the contiguous intestine in suppurative pelvic states demanding operation, which are apt to involve the rectum on the one side, or the appendix on the other. The most important pathological point is that the bacillus may find its way through the intestinal tunics when these have been injured, but not perforated.

Found likewise in the lungs and pleural cavities, it may explain those cases of septic pleuro-pneumonia which occur occasionally as sequelæ of pelvic and intestinal operations.

Stroganoff still maintains that the cervix of both pregnant and unpregnant healthy women does not usually contain microbes—that the region of the external os defines the boundary between the microbe-bearing and non-bearing regions, and that the cervical mucus destroys microbes.

Fuerbringer and Freyhau * have repeated the experiments of Ahlfeld, Reineicke, and Poten, and have come to the conclusion that the bacteriacidal property of alcohol in combination with corrosive sublimate is due to the removal of the fat from the skin of the hands, while its power of uniting with water renders disinfection of the tissues easy by the associated sublimate, or its subsequent solution, at the same time that the squamous epithelium and the superficial impurities, as well as the bacilli, are removed.

* 'Deutsche, Med. Woschens,' 1897.

Micro-organisms in the Endometrium.

Ernest Laplace, Philadelphia, as the result of a series of important experiments in Koch's laboratory, says, 'These experiments proved that in the normal endometrium numerous organisms were present, which do not want any air, inasmuch as they are quite on the surface. In endocervicitis the *Streptococcus, Pyogenes Aureus, Albus,* and *Citrous,* with *Bacillus Pyocyaneus,* were found.

'Three cases of women having gonorrhœa were examined. The same quantity of secretion was examined. Plates developed 200 to 300 colonies, but no gonococci, as they do not develop on gelatine. Microscopically, the secretions contained large numbers of micrococci and gonococci. Scrapings from the uterus showed the presence of the gonococcus throughout the degenerating epithelial cells.

'The results of the experiments proved:—

'1. The normal endometrium of uterus and cervix is a harbour for vast numbers of micro-organisms, most of which are known to us, but some still unknown, and possessing poisonous qualities for guinea-pigs.

'2. The inflamed endometrium contains the same kinds of micro-organisms, but in vaster quantities, the superficial exfoliating cells also containing them.

'3. In chronic endometritis the secretions contain about as many infectious organisms, the mucous membrane and fibrous tissue become greatly hypertrophied under the continued development of these organisms, and whether this chronic condition be simple or gonorrhœal, we find the germs both in the epithelium and fibrous tissue.

'It now becomes necessary to explain how these organisms get to the deeper parts, and how far their relations as a *cause* of the inflammation extend.

'It is plain that the mere presence of the micro-organisms does not suffice to constitute disease. Disease is the reaction upon the system—local or general, or both—resulting from the *developing* organism. In the uterus the normal secretions are a *poor* culture medium for germ life, and at the same time keep the micro-organisms at a distance from the bloodvessels. If given the proper opportunity, however, if furnished with blood or serum retained any undue length of time within the uterine cavity, micro-organisms develop therein with as remarkable rapidity as they do upon artificial culture media in the laboratory. Now the conditions will have changed, and enormous hordes of bacteria soon develop from those already present, and infect the tissues. Judging from the reaction of tissues under the influence of developing bacteria elsewhere, we should say that cold is, perhaps, the most frequent cause of the initial process; the congestion which soon follows the action of cold upon the tissues being familiar to us all. Next follows the exudation of serum, which is soon contaminated by the bacteria in the neighbourhood; these finding their most favourable soil develop rapidly, producing a chemical irritant or ptomaine which is the decomposition of the serum incident to their growth; this acts as a direct chemical irritant which keeps up indefinitely the irritated condition of congestion, and hence hypernutrition of superficial cells, proliferation of cells resulting, which cells naturally find their protoplasm inoculated from the first with the bacteria under whose impulse they developed.

'In the chronic form, with hyperplasia of fibrous tissue, there seems no explanation save that the original infection took place as above described, and that, either from neglect or other causes, the parts have become so irritated that the deeper fibrous tissue, under constant congestion, became infiltrated with white blood corpuscles by diapedesis, which gradually built new fibrous tissue, dovetailing with that already existing.

'Simply from a histological and pathological standpoint, inasmuch as the foundation of treatment in disease is the removal of the cause, finding that these micro-organisms exist nearly always to a certain depth, curetting is the rational treatment—removal of all the diseased cells through which we could not expect an antiseptic to act. Thorough scraping being done, it but remains to so sterilize the regenerating mucous membrane as to leave it uncontaminated. Here the acid sublimate solution finds a happy application in the strength of

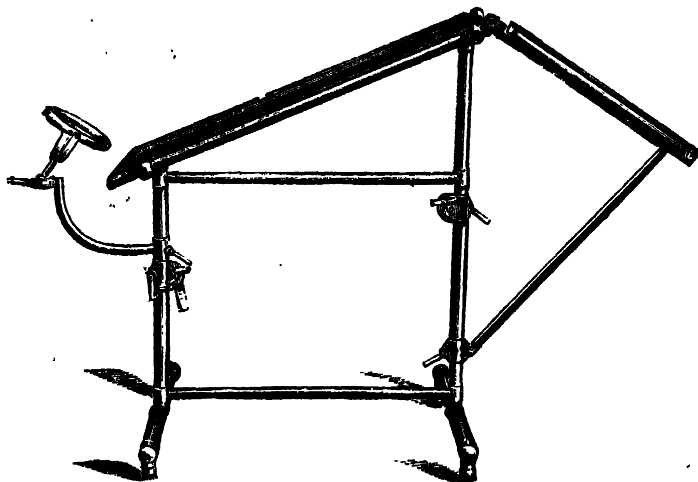


FIG. 134.—GREIG SMITH'S TABLE OF GLASS AND NICKLE.*

1 in 2000 to 1 in 5000. At the end of a few days the uterus replenishes itself with a new mucous surface.' †

In the recent congress, Richelot, of Paris, introduced the subject of the relative value of antisepsis, and improved techniques, for the actual results of gynæcology. Little, however, was added to our knowledge of surgical technique. Richelot emphasized strongly that, side by side with any aseptic or antiseptic methods, there must be complete technique on the part of the surgeon and those engaged in the operation, exact hæmostasis, and complete anæsthesia. The longer the operation the greater the chances of infection

* I used this table for some years, and do so occasionally still. It has the fault that, as it is ordinarily made, the Trendelenburg position is not sufficient, and it is not adapted with leg-rests. These I have added, and had the incline for 'Trendelenburg' increased.

† *American Journal of Medical Science*, Oct., 1892.

but, he is careful to add, rapidity of execution should not supersede prudence in operation. A bungling operative procedure may neutralize our aseptic precautions. The more the vitality of our patient is interfered with by disease, the greater need there is for dexterity of execution and attention to detail in operation. The continual effort, says Richelot, to perfect asepsis, 'has developed the most admirable results.' If we cannot destroy the existence of bacteria, we may at least prevent ourselves from carrying infection to our patient.

We may take it that the peritoneum is endowed by bacteriacidal qualities which are increased in direct ratio to its power of absorption. Irritation of the peritoneum by chemicals predisposes to peritonitis and sepsis, as also does the presence of stagnant fluid or a blood-clot in the peritoneal cavity. Ascites predisposes to peritonitis and sepsis by the prevention of absorption, and by the culture medium which the ascitic fluid furnishes.

Kelly lays emphasis on the investigations of Muscatello (*Virchow's Archiv.*, 1895), which show that an intra-peritoneal current carries fluids and small particles to all the diaphragm, and that the rapidity or otherwise of the current is influenced by gravity. Such particles pass through the lymph spaces of the diaphragm and thence into the lymphatic vessels and glands from whence they reach the blood.

From the blood such solid particles are deposited in the collecting glands of each organ. Kelly, from Muscatello's experiments, regards the elevated posture as a prophylactic against peritonitis.

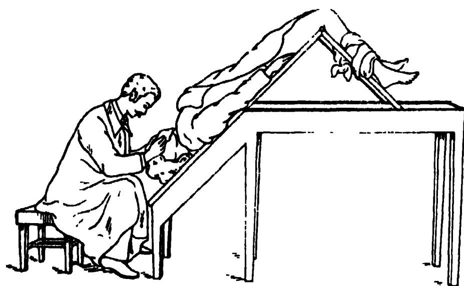


FIG. 135.



FIG. 136.

Pozzi, Lejars, and Jayle have availed themselves of the Trendelengburg position in cases of urgency, through the use of very simple tables, as that one shown in Fig. 135, and by the help of an assistant (Fig. 136).*

* Lejars, 'Traité de Chirurgie d'Urgence.' (Paris, 1899.)

For sterilisation of tents, *vide* pp. 84 and 170.

CHAPTER V.

SOME MINOR GYNÆCOLOGICAL OPERATIONS.

Applying Nitric Acid to the Cavity of the Uterus.—This is a simple step that any intelligent practitioner should be able to take in chronic cases of endometritis and subinvolution which must occasionally come under his care. When efficiently carried out, it is a safe as well as most satisfactory therapeutical measure. Of recent years I rarely apply nitric acid to the fundus. In cases requiring the use of this remedy, I prefer curettage and the application of chromic acid. It is doubtful, however, whether the nitric acid treatment, in certain cases of climacteric menorrhagia and metrorrhagia, and in subinvolution, as well as in the menorrhagia which follows on abortion and miscarriage, is not the most efficacious treatment.

It is a step which should be avoided immediately before or after a period. It is well also in all operations on the uterus or ovaries to secure such mental rest and quiet as we can, and to subdue any morbid excitement of the nervous system generally. For this purpose a dose of twenty-five grains of bromide of ammonium or bromide of potassium may be given for a few nights before operating. The secretions should be seen to, and the rectum, if necessary, emptied by an enema on the morning of any operative interference.

The uterine canal has been previously dilated. The patient is on a table. The instruments we require are—a duck-bill speculum, a few uterine wool-holders, and uterine retractors. We have also the fuming nitric acid, vaseline, glycerine, and some absorbent cotton-wool at hand. It is indispensable to have an assistant or nurse.

The woman is placed in the semi-prone or lithotomy position, and brought well to the edge of the couch opposite a good light. Sims' speculum is introduced, and the uterus is steadied and drawn well into view *with a tenaculum* and under control. A thin layer of

cotton-wool has previously been rolled tightly round one of the platinum probes to the extent of about two inches. The sides of the vagina and the vulva are carefully protected, and are drawn to either side with retractors. The probe is now dipped lightly in the acid, and it is a good plan to roll it on the side of the slice so as to press out any superfluous acid. It is then carried to the fundus, and cautiously withdrawn so as not to touch the soft parts.

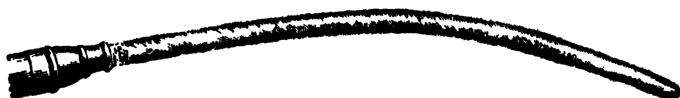


FIG. 137.—EXACT SIZE OF HOLDER COVERED WITH THE WOOL.

If the uterine canal be thoroughly dilated and dried, the use of an intra-uterine cannula, such as that of Atthill, may be dispensed with. The second of the uterine probes is ready charged with some vaseline, which it is well to pass after the acid has been applied to the fundus uteri. It helps to prevent adhesions. A tampon of moistened chinosol gauze is placed in the vagina. Before passing



FIG. 138.—ROUGHENED END OF WOOL-HOLDER.

the probe armed with the acid into the uterus, it is essential to completely arrest any bleeding that may have occurred. The patient should remain in bed and have the vagina dressed each day; any discharge must be carefully wiped away, and a fresh tampon placed in the vagina. These same directions apply to the use of a strong chromic acid solution.



FIG. 139.—HALL'S LANCET.

Depletion of the Cervix Uteri.—For this purpose the cervix uteri is exposed with a good-sized tubular speculum, the patient lying on her back. A Hall's lancet (a set of different sizes in a small case may be had) is taken, and some punctures, according to the quantity of blood we require to take, are made in the cervix and the neighbourhood of the os uteri. A speculum slice is slipped under the lip

of the speculum, and the blood is permitted to run into it. I believe rather in occasional depletion than in the abstraction of a large quantity of blood at one time. It is better not to make these punctures too freely.

I am aware of a case in which, having recommended depletion of the cervix, the incision was carried so deeply that the patient bled profusely before any assistance could be had, and dangerous syncope followed. In another case where the cervix was scarified at the house of the medical man—no precaution being subsequently taken—the patient, after her return home a little distance, had very smart bleeding, which naturally caused alarm to her and her friends.

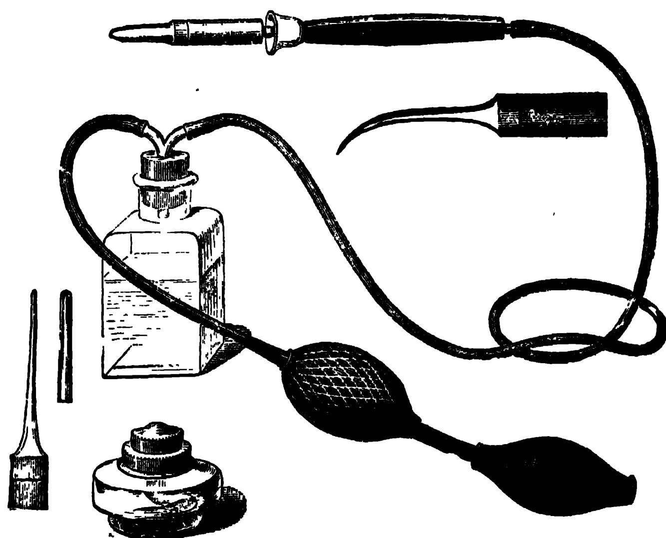


FIG. 140.—PAQUELIN'S THERMO-CAUTERY.

When we judge that sufficient blood has been drawn, it is easy to stop any further loss by a plug of dry wool pressed up through the speculum against the cervix uteri. A few such tampons will arrest the bleeding. The vagina is tamponned temporarily with some antiseptic wool. It is well to deplete, especially in cases of congestion and dysmenorrhœa, shortly before the advent of a period.

Aspiration.—When an aspirator is used for therapeutical purposes, I prefer the larger needles, as shown in Fig. 72. The aspirator I have been using for years, and which I have found most convenient, is that of Matthews (Fig. 71). The needle-points are protected after insertion by a cannula; the piston also completely prevents the admission of air.

The Actual Cautery.—When for any purpose we desire to employ the actual cautery, there is no appliance to surpass for general use the benzoline cautery of Paquelin. It is available also for cutting purposes, growths, small tumours, vascular excrescences, malignant disease of the uterus, amputation of the cervical neck, perforation

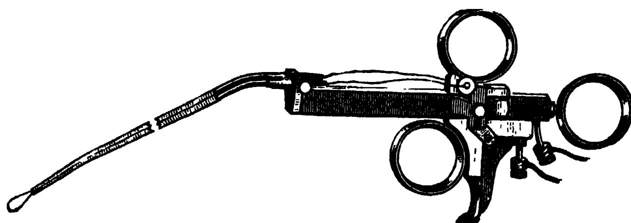


FIG. 141.—SATTLER-NIEDEN UNIVERSAL CAUTERY HANDLE.

of a fibroid tumour of the uterus, and hæmorrhoids. For very small tumours and for operation on the urethra, the galvano-cautery answers admirably. Fine platinum points can be obtained of any shape. All instrument-makers now furnish portable cautery batteries. Porcelain cautery points can also be had if required.

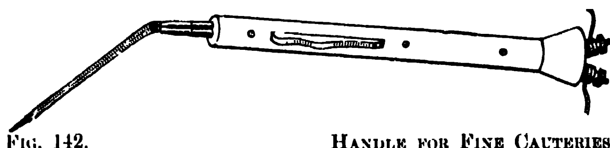


FIG. 142. HANDLE FOR FINE CAUTERIES.

Incision of the Cervix Uteri.—Simple incision of the lower part of the cervix is rarely now resorted to. If the cervical canal has to be cut the only operation that affords any relief is that in which the internal os is also divided. It is of advantage in cases of endocervicitis, when we have a small os externum in which we require room

FIG. 143.—PORCELAIN CAUTERY.

for intra-uterine medication; also in those cases of congestive and mechanical dysmenorrhœa associated with conical cervix and pinhole orifice. The incision is best performed with a Kuchenmeister's scissors (Fig. 144), the intra-uterine blade of which is introduced to the desired extent into the canal of the cervix, and, either bilaterally or through the posterior wall, the cervix is divided. It must

be remembered that even with this simple step it is necessary to adopt every precaution. Therefore, before performing it the patient should be told that she must remain quiet and stay in bed for a day or so after the operation. She should run no risk from cold or coitus.

A dose of bromide of ammonium may be administered for a few nights. The rectum is cleared before operation. The vagina



FIG. 144.—KUCHENMEISTER'S SCISSORS.

is carefully disinfected and the step is taken under thorough aseptic surroundings. Sims' or the dorsal lithotomy position is chosen; the uterus is drawn well into view and held by a hook. The operator sees thoroughly how far he is cutting, and the extent of introduction of the blade. After division, bleeding is carefully arrested. It is generally controlled by a few dry plugs, pushed well against the wound, or a little pad of styptic wool is carried

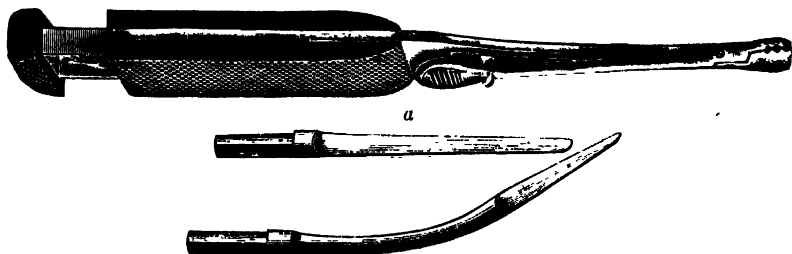


FIG. 145.—MARION SIMS' KNIFE. *a*, blades (natural size) contained in the handle.

up and pressed into the incision, and allowed to remain. If any little vessel gives trouble a fine hæmostatic forceps will control it. After the bleeding has ceased, a plug of antiseptic wool is left in the vagina. The wound must be kept open with a uterine probe.

DIVISION OF THE CERVIX UTERI AND INTERNAL OS.—In cases of sterility where dilatation has failed, in severe endometritis with

dysmenorrhœa, and in spasmodic dysmenorrhœa, division of the cervix uteri and internal os is indicated. It is a far more efficacious step than division of the cervix alone. We are more likely to have hæmorrhage from the uterine vessels; we are closer to the peritoneum; there is a greater risk of metritis, and there is more immediate shock to the woman. Every precaution taken in the simpler operation is adopted in this. The instrument I prefer is a Sims' knife. The blunt-pointed, straight, and curved blades are carried in the handle. They can be adjusted at any angle to its long axis. The preliminary steps are those taken for division of the cervix. The knife is then passed through the cervix uteri and internal os. The incisions are carried laterally or posteriorly. The posterior incision, with the exsection, as suggested by Sims, of a small triangular portion of the neck of the uterus, has the great advantage that it places the axis of the patient's uterine canal in the most favourable position for conception. This is still more apparent if there be an anteflexion associated with the sterility. I do not advise the use of any of the many mechanically contrived metrotomes. The only stems I use are either those made of glass as advised by Sims, or, what I far prefer, my celluloid and wire stems (Fig. 146). No precaution must be omitted, after incising the cervix, against exertion, cold, coitus, or septic contagion. It is better to keep the canal open with one of the stems here suggested.


FIG. 146.—AUTHOR'S CELLULOID-WIRE STEM.* (Arnold.)

PARACENTESIS ABDOMINIS.—This is an operative measure sometimes demanded—

(*a*) For purposes of diagnosis (ambiguous cases);
(*b*) Where the operation of ovariotomy is contra-indicated, to prolong life;
(*c*) As a palliative measure, to gain time in certain cases, and to afford temporary relief;
(*d*) In some cases where pregnancy or ascites complicates ovarian dropsy.

It has to be remembered that simple tapping of an ovarian cyst has

* This can be moulded to any shape, and by means of a loop of Chinese silk passed through a hole in the short handle of the stem it can be readily withdrawn by the nurse or patient herself.

been frequently followed by death from shock, peritonitis, the escape of cyst contents, or blood escaping into the peritoneal cavity, and septicæmia. Therefore it is well, in preparing to tap, that we should decide beforehand clearly with what object the step is taken. *Rarely is it justified in ovarian cystoma.* If our desire be to assist the diagnosis, then I prefer the aspirator (Fig. 81). The rod in the



FIG. 147.—SYPHON TROCAR OF SIR SPENCER WELLS.

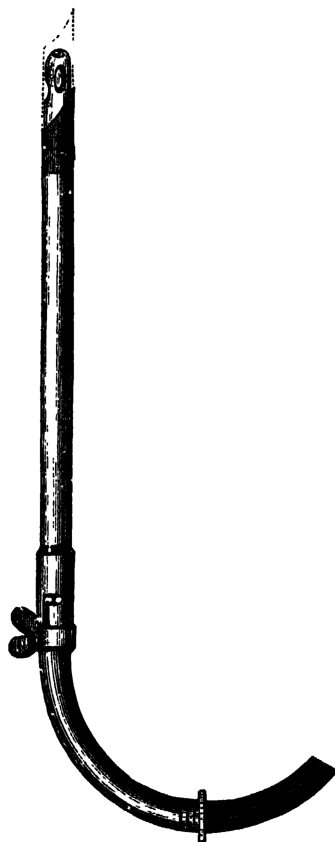


FIG. 148.—GUARDED TROCAR OF SIR SPENCER WELLS.

needle prevents the admission of air. Such a needle will possibly empty even a large cyst. If we have a doubt as to the nature of the fluid, while, at the same time, we are anxious to tap the cyst, the trocar of Spencer Wells is an admirable instrument (Fig. 147). The larger the bore of the trocar, the safer it is in all such cases. One

of the most awkward accidents of paracentesis is the clogging of the tube with semi-solid material, and the escape of cystic fluid as a consequence into the peritoneal cavity. Having decided to tap, we prepare our patient by attention to the secretions, giving a dose of bromide of potassium on the night previous to the operation. Immediately before it the urine is drawn off by an assistant. Save to allay nervousness, an anæsthetic is not necessary. Chlorethyl spray, or, if this be not at hand, anæsthetic ether sprayed on the site of the small preliminary incision, or, as Goodell advises, the application of a lump of ice, the end of which has been dipped in a little salt, will deaden the sensibility. It is better, if possible, to select the linea alba. It is the exception when we are compelled to make the puncture elsewhere, through the accident of some solid matter occupying the position of the median line. The abdomen, having been thoroughly worked and cleansed, may be embraced in a split roller. This is drawn tighter as the fluid escapes, and it serves to support the abdominal wall during the emptying of the sac and the removal of the pressure from the great vessels. The woman is brought well

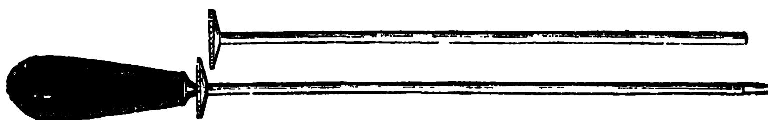


FIG. 149.—FINE ASPIRATING TROCAR AND CANNULA.

to the edge of the bed, the abdomen projecting over it. A bucket with a little water in is at hand to receive the contents of the cyst, so that the end of the tube attached to the trocar may dip below the surface, and thus the admission of air be prevented. A small incision is now made over the linea alba, in the abdominal integument, midway between the pubes and umbilicus, and the sterilized trocar is plunged into the cyst. If it be a polycyst, the trocar may be made to pierce the other cysts without withdrawal. When the fluid has ceased running, extra caution must be exercised in preventing the admission of air, or any fluid likely to excite inflammation.

The wound is closed with dry antiseptic dressing. If the incision should have been made too large, a silver-wire suture must be inserted. The prepared thymol or iodoform pads will be found most convenient to lay over the wound after all such operations. The same care should be exercised to anticipate peritoneal inflammation after paracentesis as after the more formidable operations of abdominal section.

*Vaginal Punction.**—In a limited number of cases, it may be necessary to remove fluid from a cyst, ovarian or other, by the vagina. A small cyst may be localized in the pelvis, occupying Douglas' space. In a multilocular cyst the solid part may be above, and the fluid cysts distend the lower portion of the tumour. When we are uncertain of the nature of the swelling, whether ovarian or tubal, it may be necessary to explore. *All the dangers of peritonitis and septicæmia are to be guarded against in vaginal tappings.* The vagina has to be previously prepared as already described (chapter on Asepsis and Antisepsis) and all instruments used are sterilized. It is preferable, as a rule, to use an aspirator; otherwise, a long curved rectal trocar, or, still better, the small guarded ovarian trocar of Spencer Wells, must be chosen, with a tube attached, the lower end of which can pass into some fluid in a vessel at the side of the bed. The patient is best placed in the lithotomy position. The rectum and bladder (as in all operative procedures on the pelvic viscera) are first emptied. A careful and final exploration of the pelvic organs is made. The most prominent part of the tumour is felt, where we find the most distinct sense of fluctuation, and the trocar is guided to this spot by the middle and index fingers of the left hand. The bulging portion is now pierced with the trocar, which is then withdrawn, and the fluid is permitted to flow off by the cannula and tube. There should be no meddling after the withdrawal of the fluid. Sterilized iodoform gauze is used for tamponning the vagina. The greatest care is necessary for several days. The patient is kept on her back and the pulse and temperature are watched. The bladder must be regularly relieved by the catheter, and it is well to keep the bowel quiet for a few days.

All that has been said of paracentesis 'per vaginam' applies to the relief of a pelvic hæmatocele by aspiration or tapping. *It is right to insist on the comparative danger of this step.* Two facts must always be before the mind of the surgeon in deciding to puncture a peritoneal hæmatocele. First, we open into the peritoneal cavity, and we admit air into a fluid prone to decomposition; hence we expose our patient to the risk of septicæmia. Secondly, it has to be seriously considered if we increase the chances of recovery. Much must depend on the source and situation of the hæmatocele. My individual experience of all cases of hæmorrhage arising from various causes would incline me rather to say, 'If it be not a case for cœliotomy, let it alone.'†

* Consult chapter on Perimetritis and Pelvic Suppuration.

† Consult chapter on Pelvic Hæmorrhage.

Some years since I saw a lady in whom a huge hæmatocele, the result of an accident, was completely absorbed, the upper limit of which at one time reached nearly to the umbilicus. The treatment mainly consisted in the application of Leiter's iced abdominal irrigator to the abdomen, hot antiseptic douches (hydrarg. perchloride) per vaginam, and the internal administration of hydrastia with ergotine and lupulin. For some time abdominal section was thought of, or puncture; but as the patient seemed to progress favourably under the treatment there was no interference, and the result was a complete recovery.

If it be decided to puncture, or to remove clots, either from the quantity of fluid in the tumour or the symptoms of septicæmia being imminent, we must determine our site of puncture according to the character of the swelling and the situation of its most prominent surface. The posterior cul-de-sac of the vagina will be found the most suitable and convenient place to puncture. The aspirator is the best instrument to use. In the instance of purulent accumulation in the pelvis, the trocar and dilator of Landau is a most

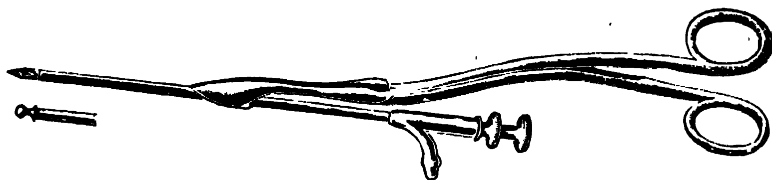


FIG. 150.—TROCAR AND DILATOR FOR PELVIC ABSCESS (Landau.)

useful instrument. The trocar and cannula run in a groove between the blades of the sharp-pointed dilator. Having, with the trocar, determined the presence of pus, the closed blades of the dilator are pushed on into the cavity, and these are then separated so as to permit of the enlargement of the opening and the full flow of fluid. If we be deceived in the sense of fluctuation, and find either a smaller quantity of fluid than we anticipated, or only softened clots—or that no fluid comes with the aspirator—the question immediately arises, should we lay open the mass and remove the clots? The decision must depend on the urgency of the local or general symptoms—great pelvic distress in the bladder and rectum on the one hand, symptoms of septicæmia on the other. It is impossible to lay down dogmatic rules for guidance in such cases. Each individual case has its special peculiarities and bearings.* The frequency with which tubal pregnancy is the cause of the effusion has to be always remembered. Abdominal section is here the clear

* See chapter on Pelvic Hæmorrhage.

indication. Influenced by surgical instinct and experience, we must do all that is possible to save our patient, avoiding unjustifiable or rash risk in the one direction, and equally culpable and timid trifling with life in the other. Should we resolve to open the mass, a long bistoury may be taken (if we have not Paquelin's galvanic knife to hand), and a little lint is wrapped round the blade, as a sheath, to within about one inch of the point. The incision is carried through the posterior vaginal roof, and is of sufficient extent to admit of one or two fingers to examine for clots, and remove these if necessary. A long dressing forceps or the branched dilator can be introduced, through the small opening made, and this is enlarged by separating the blades to a desirable distance. It is needless to say that this step must be conducted with the strictest aseptic precautions. The vagina should be aseptically prepared before operating. After the evacuation of the contents of the tumour an antiseptic fluid is used, through a piece of tubing attached to the nozzle of an ordinary syringe or the cannula of the aspirator. Drainage is maintained if necessary by sterilized iodoform gauze, and the same is used as a loose tampon in the vagina.

*Relation of Hæmatocele to Ectopic Gestation.**

Necessarily the most important is the relation of hæmatocele to extra-uterine pregnancy. Such questions as the death of the fœtus and the coexistence of a fœtal sac independently of the hæmatocele, with the urgency of the symptoms, must influence the decision to operate. If the ovum be dead, operation may not be urgent. The difficulty exists of being able to recognize a tubal abortion hæmatocele apart from other causes of tubal hæmorrhage. As Falk has pointed out, it is most difficult to differentiate rupture, complete abortion (the ovum being expelled into the abdominal cavity), and incomplete abortion, where it remains in the tube. Clinically, such a differentiation is often impossible, nor can we say when the blood is encapsuled. We may be assisted in our diagnosis, as Freund has shown, if there be undeveloped mammæ, very prominent clitoris, and other evidences of cessation of pregnancy. Examination under all circumstances must be carefully and not too roughly conducted. Whether the treatment should be of an expectant character or not, must, as Veit has shown, depend upon the consideration of these circumstances, one thing being certain—that the mere presence of a hæmatocele does not in itself warrant interference.

* See chapter on Ectopic Gestation.

CHAPTER VI.

SOME MINOR GYNÆCOLOGICAL OPERATIONS (continued).

INTRA-UTERINE MEDICATION.—In gynæcological practice the treatment of uterine discharges by the topical application of agents to the uterine canal, both of cervix and body, is not so often practised as it used to be, since the operation of curettage has become so frequent. In the commonly occurring troubles—endometritis (cervical and corporeal), granular and follicular conditions of the cervical canal, discharges consequent upon gonorrhœa—we may have to make applications to the interior of the uterus. The following are some of the more important therapeutic agents employed :—

Nitric acid.
Carbolic acid.
Chromic acid.
Iodoform and iodol.
Iodine (as tincture or with glycerine).
Ichthyol, 10 to 20 per cent. solution.
Iodine and carbolic acid.
Nitrate of silver (solid and in solution).
Sulphate of zinc (solid and in solution).
Perchloride of iron (in solution).
Chloro-acetic acid (in solution).
Chloride of zinc (in solution).
Hydrastis Canadensis (liquid extract).

Mercury, cocaine, belladonna, and morphia, are best applied in the form of bougies.

I have found the liquid extract of hydrastis, either alone or combined with glycerine, carbolic acid, or tincture of iodine, an admirable application in cases of cervicitis and erosion of the cervix. I can say the same of ichthyol.

Intra-uterine medication is thus carried into practice either through the medium of solid substances, the introduction of ointments, or the application and injection of liquids. These are applied to the cervix alone, or to the cavity of the body of the uterus above the cervix.

While many women are insusceptible to the effects of intra-uterine applications, others, on the contrary, are very easily affected by such, and are peculiarly prone to suffer from uterine colic, symptoms of collapse, metritis, or peritonitis, after their use. Intra-uterine medication, then, is always to be undertaken cautiously. Before resorting to it, the woman must be placed in the best possible position to undergo this form of treatment. This caution is all the more necessary in the instance of those applications which are made above the os internum. Certain general precautions are applicable in such cases. I state these categorically.

General Precautions.

Let the vagina be thoroughly cleansed. Have the patient's bowels attended to by the administration of a saline purgative; rest in bed is essential where a powerful agent is carried beyond the isthmus uteri. In all cases of narrow and contracted os uteri, it is well to dilate or enlarge it by lateral incision before we apply any substance internally. Sufficient patency of the isthmus uteri should be secured before we proceed to treatment. In each instance of intra-uterine medication, when any caustic or strong astringent has been used, an antiseptic tampon should be placed in the vagina. This is the more requisite if the step be taken in the practitioner's house, and if the patient has to drive or walk any distance subsequently. No application should be made *immediately* before or after a menstrual period. The safest, most convenient and effectual method of applying any remedy to the canal of the uterus is by means of the uterine cotton-wool holder. The probe can be curved to any shape, so as to pass readily into the uterus. It is well to have two holders, as one is necessary to clean out the uterus. This is readily done by rolling a layer of cotton-wool tightly round the end of the probe, and wiping out the uterus with it. At times a difficulty is experienced in removing the tenacious plug that fills the cervix in some cases of endometritis. By placing a little more wool on the probe, and rotating, we may detach it; but a small conical sponge, held in a miniature sponge-holder, will answer the purpose better than anything I know of.

When about to dress the uterus in the manner spoken of, it is well to have the patient in front of a good light on the obstetric couch, in one of the positions already described. The dorsal decubitus is the most convenient. I have already alluded to the mode

of applying nitric acid to the fundus uteri. In all cases where we have any difficulty in reaching the cavity of the fundus, the duck-bill speculum should be used. One tampon of wool is ready at hand, and some half-dozen small pieces are prepared to wipe the vaginal roof and surface of the uterus. The cervical canal is cleaned out and dried, and the uterine probe, armed with the cotton-wool saturated with the solution, is carried the desired length into the uterus. When this is withdrawn, the vaginal tampon is introduced.

Of the substances named, the strength of any solution selected must depend on the character of the case and the effect we desire to produce. The safest rule for surgeons to follow is to select a medium strength of any medicament, and never to begin with the maximum of that recommended. On the whole, it is better to be below than above even the medium strength of some solutions. The subjoined are those that, as a rule, will be found safe and serviceable :—

1. Nitric acid (applied as directed), pure.
2. Carbolic acid and glycerine two parts to one, and equal parts. (Extract of hydrastis, one part, may be added.)
3. Carbolic acid, glycerine, and tincture of iodine: equal parts, or combined with extract of hydrastis.
4. Carbolic acid and ext. hamamelis (liq.): equal parts.
5. Chromic acid: gr. xx.–xxx. ad ℥i.; or the same solution with equal parts of glycerine.
6. Iodine: gr. xxx.; spt. rectif., ad ℥i.; or tincture, with equal parts of glycerine.
7. Nitrate of silver: gr. xx.–xxx. ad ℥i.
8. Perchloride of iron: gr. xx.–xxx. ad ℥i. (glycerine or water), with one part of No. 2 Solution.
9. Sulphate of zinc: gr. xxx. ad ℥i.; or with one part of No. 2 Solution.
10. Chloride of zinc; gr. xxx. ad ℥i.; or with one part of No. 2 Solution.
11. Ichthyol solution 10 to 20 per cent.

These solutions will be found to answer for most cases. It is a good plan in periodical dressings to vary the nature of the application. A desired effect will often follow this change in topical treatment.

Intra-uterine Injection.—I never resort to intra-uterine medicated injections into the cavity of the uterus. I do not care to run the unquestionable risks attendant upon their employment. The less fluid we leave in the uterine cavity after any topical application, the

better. This applies with double force to the undilated organ; in it metritis, peritonitis, collapse, colic, collulitis, and perimetritis are more likely to follow the injection of fluids. If they be used, it should be with such an instrument as the urethral injector of Sir Henry Thompson, which I have for years successfully employed in gleety states of the male urethra. Such an intra-uterine medicator I had made for me. It has a uterine curve, and answers well for introducing fluids. It contains a sponge, moistened with the solution, which is carried down to the apertures in the curve of the instrument, and thus a small quantity can be squeezed through these into the urethral or uterine canal. Withdrawing the sponge lightly, we can permit the reflux of any fluid that may remain, before removing the instrument. I see no advantage to be gained over the application with the uterine probe and saturated wool. If intra-uterine injections be used, we must be careful to—

(1) exclude the possibility of any flexion of the canal;
(2) secure free exit for any fluid by previous dilatation of the canal;
(3) inject (the patient being in bed) within a week *after* the menstrual period, and take every possible precaution to anticipate and prevent *subsequent* inflammation;
(4) avoid the admission of air;
(5) never use nitrate of silver solution by injection;
(6) first wash out the uterus with a little warm water, to ascertain the uterine sensitiveness.

Tincture of iodine, diluted; carbolic acid, with glycerine and water; perchloride of iron, in water; chromic acid, in solution; sulphate and chloride of zinc, in water—have all been used. The strengths should be weaker than those we employ of the same agents with the cotton wool and probe.

A fairly safe injector to use is a small glass syringe which fits accurately to a hollow uterine sound with fine apertures at the point. Whatever fluid be employed, at the most only five to ten drops should be injected at the time. I repeat that in practice I believe intra-uterine injection to be a needlessly venturesome plan of treating unhealthy endometric conditions.

I never now use any ointment in intra-uterine therapeutics.

INTRA-UTERINE MEDICATION BY CRAYONS AND BOUGIES.—Fused sticks are sold for the purpose—as those of Braxton Hicks, which are made of sulphate of zinc. I have altogether abandoned the use of all such crayons and bougies, although I have never known any ill effects follow their application. We can with the *porte-caustique*

introduce bougies of iodol, iodoform, cocaine, belladonna, iodide of mercury, and europhene. Nitrate of silver is used in combination with nitrate of potash made into small moulds, or it may be readily fused in a little platinum crucible, and applied on the point of a uterine probe. Many years since, Lombe Atthill advocated intra-uterine application of the solid nitrate of silver in subinvolution of the womb, attended by severe menorrhagia, regarding it as 'both simple and safe.' These substances are applied through the *porte-caustique* (Fig. 151), a hollow uterine sound open at the end. The little caustic stick is inserted into this, and pushed home into the uterus by the stylet, which fits the tube accurately. But we must be careful to withdraw the *porte-caustique* a little from the uterus when pushing in the stick, so as not to penetrate the uterine wall.

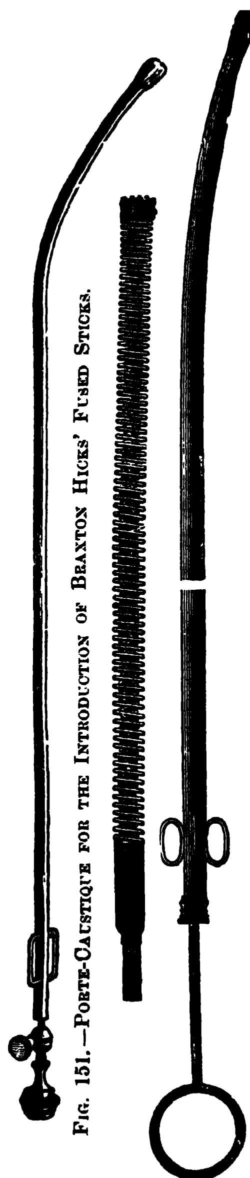


FIG. 151.—PORTE-CAUSTIQUE FOR THE INTRODUCTION OF BRAXTON HICKS' FUSED STICKS.

FIG. 152.—AUTHOR'S INTRA-UTERINE MEDICATOR.

Intra-uterine Suppositories.—Very small suppositories can be readily had to order of any good chemist, made of cacao-butter and glycerine, containing belladonna (gr. ii. of extract), morphia (gr. $\frac{1}{4}$—$\frac{1}{2}$), carbolic acid (gr. ii.), iodoform (gr. iii.), tannic acid (gr. x.), and alum (gr. x.); these agents may be used either singly or in combination. To these we may add cocaine or eucaine (gr. ii.). They can be inserted through the *porte-caustique.* I do not care to introduce unctuous or greasy substances into the uterine cavity. I believe the safest, the most generally convenient, and the most efficacious means of treating abnormal states of the endometrium, short of curettage, is by the aid of the uterine cotton-wool holder.

Potassa Fusa and Potassa cum Calce.—Both these caustics, the former being the more deliquescent and

powerful, are by some surgeons employed in malignant disease of the uterus. They require to be used with considerable caution. I do not myself now employ either of these agents. They are thus applied: The patient is placed in the dorsal position, with the legs drawn up and held apart. A large-sized Fergusson's speculum is introduced, and the cervix brought well within the tube. Some absorbent cotton-wool, saturated with vinegar, is packed round the lower part of the cervix, separating the rim of the speculum from the part to which the caustic has to be applied. The pencil of caustic is now taken



FIG. 153.—SMALL PLATINUM CRUCIBLE FOR FUSING NITRATE OF SILVER.

in the holder, and used lightly or otherwise, according to the desired object. The more freely it is rubbed on, the greater the depth of tissue destroyed, and the larger the slough. A stream of vinegar and water is then directed on the part, the wool having been removed. A pledget of cotton-wool, soaked in equal parts of vinegar, glycerine, and water, is now pushed up against the cervix, and allowed to remain in the vagina. Uterine pain is relieved by a subcutaneous injection of morphia, and a belladonna and morphia suppository introduced into the vagina.

[The method of applying chloride of zinc in solution or paste is described in the chapter dealing with the treatment of malignant disease of the uterus.]

THE OPERATION OF CURETTAGE.

The Use of the Uterine Curette.—The value of curettage of the uterus as a therapeutical step in diseased conditions of the endometrium cannot be too strongly insisted on. In chronic endometritis, in the case of fungosities of the cavity of the body, in granular endocervical conditions, in hæmorrhagic endometritis, in the instance of small mucous polypi attendant upon follicular degeneration of the endometrium, for placental polypi and the granulations which remain after adhesions following discharge of the ovum, in the case of soft growths which we are apprehensive are of a malignant nature, the use of the curette is indicated. Many of these states are attended with persistent or recurring hæmorrhage. Properly conducted curettage, completed by the application of chromic acid to the uterine cavity, has superseded, in my practice, all that tedious and unsatisfactory medication of unhealthy states of the

endometrium which exhausts the patience of the surgeon and the confidence of the patient.

In many operations of curettage it is not necessary to dilate the cervical canal beforehand, as it is already either sufficiently patent to admit a large-sized curette, or it can be made so at the time of operation by the use of dilators. In other cases in which there is more or less contracted isthmus, or in which we wish to explore the uterus digitally, as well as to curette it, previous dilatation with laminaria tents is the plan I always adopt. I then take the following precautions :—

Previous Use of Antiseptic Tents.—Tents of different sizes are kept in a saturated solution of iodoform in ether.* They are taken direct from this solution for use. The vagina has been previously well douched with a chinosol solution and tamponned. The patient is placed on a table in the dorsal position. The duck-bill speculum is used. The uterus is drawn well down with a tenaculum. The vagina is now thoroughly douched out with sterilized water, and dried with chinosol wool. One or two tents (they should be from four to five inches in length) are selected and given the necessary curve. The uterus is steadied, and the tent or tents are pushed home. It is, as a rule, preferable to introduce only a single tent the first application. The vagina is now loosely tamponned with iodoform or chinosol gauze, and the patient is put to bed.

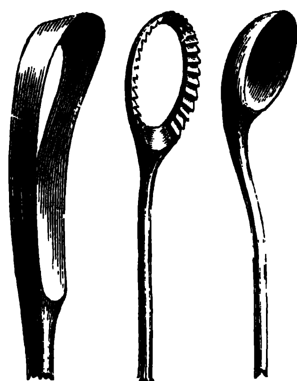


FIG. 154. FIG. 155. FIG 156.
VARIOUS UTERINE CURETTES.
Actual sizes.

Supposing this application to be made in the morning, the dilatation needful for ordinary curettage will be secured by midday, or, if at night, by the following morning. Should further dilatation be required, as for exploration, the patient is again placed on the table, and, after the removal of the tampon and tents, the vagina is again thoroughly douched out, and the cavity of the uterus is wiped out with $\frac{1}{5000}$ perchloride solution. The longer tent or tents are then introduced. I complete, at the time of operation, the needed dilatation with my larger-sized metal bougies.

With such antiseptic precautions, it is not, I believe, possible that

* See chapter on Asepsis, p. 113.

any septic effects can follow the use of tents. No bad consequence has ever attended upon any operation in my practice from the use of this means of dilatation.

Operation.—The patient, having had an aperient the previous night, and an enema the following morning, has the vagina douched out well, and tamponned antiseptically. She is then placed on the table, under an anæsthetic, in the usual dorsal position. The large duckbill or other vaginal retractor is used to expose the uterus,



FIG. 157.—LIGHT METAL SPOON CURETTE.

which is drawn down with a tenaculum. If a tent has been used, this is withdrawn, and the uterine cavity is douched out with sterilized water, and then wiped dry with sterilized gauze. A. Martin's curette (Fig. 158) is then taken and introduced as far as the fundus,

FIG. 158.—A. MARTIN'S CURETTE.

and by rotatory movements the curettage of the cavity of the uterus is effected. This is continued as far as the cervix. The sharper curette (Fig. 154), or other, as is deemed necessary, according to the character of the case and the size of the particles to be detached, is introduced, and the denuding process is completed. I

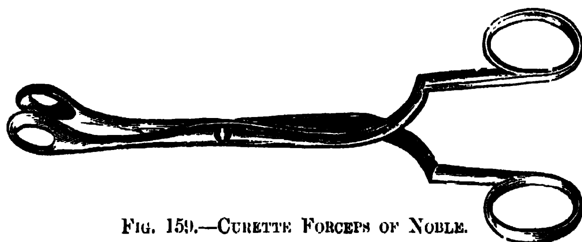


FIG. 159.—CURETTE FORCEPS OF NOBLE.

prefer, when we have reason to suspect products of conception, to use the large spoon curette (Fig. 156). The selection, however, will greatly depend on the resistance of the tissues on the spot we are operating upon. With a fine long pipette the uterine cavity is washed out from time to time, and when the curettage is completed it is mopped out, first with strips of sterilized gauze, carried well in on slender forceps, as shown in Fig. 160. It is now dried with sterilized iodoform, and if it be indicated, the uterine probe with

cotton-wool tightly rolled on it is dipped in chromic acid solution (grs. xxx.—ʒ i. to the ounce), and is carried into the uterine cavity, and the application of the acid is made. The vagina and cervix are now dried, and finally a strip of sterilized iodoform gauze is carried into the uterine canal and the vaginal end is tied with silk, which is distinguished by one knot being made. A larger strip of moist chinosol gauze is now loosely placed in the vagina and tied in the same manner, but with two knots, which serve to distinguish it

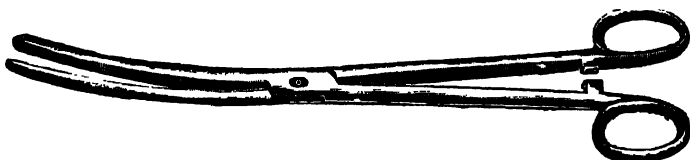


FIG. 160.—SLENDER CLAMP FORCEPS FOR CARRYING GAUZE INTO THE UTERINE CAVITY.

when the tampon is being removed. These tampons are not disturbed for forty-eight hours. It is well to give a bromide of potassium mixture at intervals for the first twenty-four hours, and to place a trional suppository in the rectum the night of the operation. It is my practice, after forty-eight hours, to tampon the vagina loosely for the first week with moistened chinosol or sterilized iodoform gauze. After this it is well to use a daily antiseptic douche for another week.

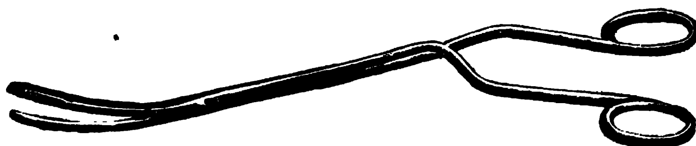


FIG. 161.—SLENDER INTRA-UTERINE FORCEPS FOR WIPING OUT THE UTERINE CAVITY WITH GAUZE OR COTTON WOOL. This latter is firmly secured by enclosing a portion of the gauze between the blades, and then wrapping it round.

It is now clearly established that the endometrium, after an aseptic curettage, is reproduced in its entirety within a period of from eight to ten weeks. The contrast between the normal appearance of the mucosa after the curette, and after the employment of caustics, is marked. In the latter case, there is an atrophic condition, with absence of the glands and excess of the connective tissue.

The following case, brought by me before the Gynæcological Society on July 9, 1896, will illustrate the value of curettage and subsequent application of chromic acid :—

Chronic Suppurative Endometritis, with Salpingitis, cured by Curettage, Chromic Acid, and Iodoform; Drainage of the Uterus.—A widow, aged forty-eight years, had suffered for years from an enlarged and retroverted uterus. She had also two or three attacks of pelvic perimetritis. There had always been more or less endometric discharge since the birth of her child twelve years previously. In November, 1891, she had an attack of pelvic peritonitis. This subsided under treatment, and subsequently she had a slight operation for hæmorrhoids and a small fistula of the rectum. The periods were always excessive. Suddenly, in January, 1893, having been subjected to a chill during menstruation, she had a severe attack of perimetritis, during which there was rather profuse hæmorrhage for a few days. This was attended by considerable fever, which lasted for nearly three weeks. The perimetric effusion was considerable. The uterus was forced down almost to the vaginal outlet. I feared at the time that there might be hæmatocele

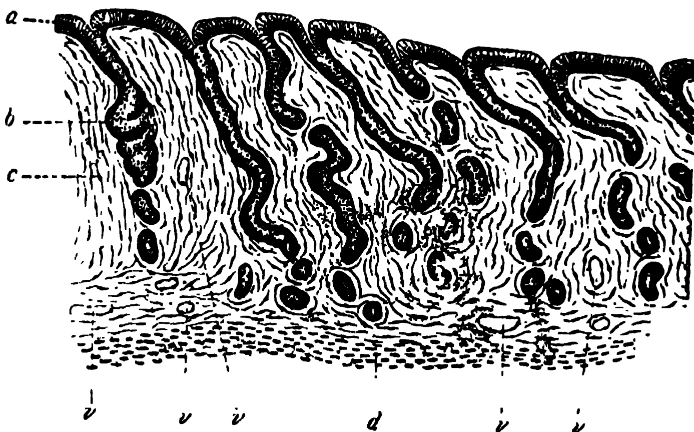


FIG. 162.—VERTICAL SECTION OF THE UTERUS THREE MONTHS AFTER CURETTAGE. *a*, epithelium; *b*, new-formed glands; *c*, connective tissue; *d*, muscular tissue; *vv*, blood-vessels. (Baldy.)

complicating the perimetritis. In the following month the purulent discharge recurred, and this continued, notwithstanding various forms of intra-uterine medication, and on two occasions a prolonged course of the bromo-iodine waters of Woodhall Spa. The general health remained good, and there was little pain; but the discharge was at times most profuse, requiring the change of four sanitary towels in the twenty-four hours. As these recurrences of discharge continued until the beginning of 1895, I determined to thoroughly dilate and curette the uterus. This I did on April 20, 1895, in the manner described in the text. The uterus at the time of operation was enlarged, the cavity measuring 4 inches, retroverted and retroflexed, in which position it was fixed. On free dilatation, a quantity of pus poured from an enlarged fundal cavity. Curettage was conducted with every antiseptic precaution. A solution of chromic acid, one drachm to the ounce, was applied subsequent to the use of the curette. The large cavity was packed with iodoform gauze,

and this, after the first few days, was renewed from day to day, the cavity each time being wiped out with a 1 in 5000 perchloride of mercury solution, and the vagina packed with tampons of the same. Some slight discharge appeared at the end of the third week, but intra-uterine dressings were continued until it had completely disappeared. The final result of this case was a reduction of the uterus to about one-half its size and the restoration of mobility. The patient is now married and in perfect health.

A lady, aged forty-two, who previously had the uterus dilated and explored, was again by me dilated, and the unhealthy portion was curetted. Carbolic acid was applied to the cavity. She had had profuse hæmorrhage for some months from a large subinvoluted uterus. There was some attendant endometritis. On the third day she had a severe attack of uterine colic. This was followed by a long and anxious time, during which an abscess formed in the left broad ligament, which was opened from the abdomen and drained. The patient finally made an excellent recovery, and from the date of the operation to the present time there has been no bleeding. This is the only instance in which any complication has followed the operation in my hands.

Dangers of Dilatation and Curettage.—The point must be emphasized that curettage, especially in chronic cases of uterine affection, is not without its risks. This remark applies particularly to the operation when it is carried out with the aid of dilatation in the instances of women in whom there may be reason to suspect past trouble of the adnexa. Dormant states of the ovary and tube may be roused into acute disturbance, and suppurative mischief in the adnexa may be started. This may occur even though every conceivable care and precaution has been taken in carrying out the operation.

The case above quoted is the only instance, in some hundreds of curettage cases, in which I have had any trouble following the operation.

Christopher Martin, in a paper entitled 'When and how to curette the Uterus,' confirms the caution I have given in the text with regard to salpingitis.

'I have seen,' he says, referring to curettage when there is old or recent septic or gonorrhœal inflammation of the adnexa, 'a slumbering salpingitis converted into a virulent and fatal pyo-salpinx by such a proceeding.' Again, his criticism on temporizing with offensive discharges or hæmorrhage, due to the retention of the products of conception, cannot be too strongly emphasized, though in these cases special care has to be taken with regard to dilatation and antisepsis. I cannot but agree with his comments on curettage as a palliative for hæmorrhage consequent upon simple myoma. I am convinced that 'useless scraping' of the endometrium, as is sometimes done in these cases, is attended with risks of sepsis, and is of no permanent benefit. In cases where it may be thought necessary, oöphorectomy is a far preferable procedure. As to cancer, he makes the practical comment that, 'at best, the respite is short, and in many cases when the disease again manifests itself it

advances with fearful rapidity. When the growth is strictly limited to the cervix or the endometrium, we should offer the patient the more certain hope of cure afforded by vaginal extirpation of the uterus. If the disease be too far advanced for this operation, the less we interfere with it the better.'

On the other hand, it is only right to say that I have had some excellent results in temporarily arresting hæmorrhage in cases in which the patient would submit to no operation other than curettage, and in which the use of the curette was followed by an application of chromic acid.

Orloff also advocates the operation in such cases, as allowing time for recuperation in small fibroids which do not cause pain, and in those instances where the menopause is approaching.

In two important communications made to the Obstetric and Gynæcological Society of Paris, June, 1895, by Bonnet and Fournel, and quoted by Edge in the *British Gynæcological Journal*, February, 1895, p. 384, the relative indications and contra-indications, advantages and disadvantages, and the dangers of dilatation of the uterus and drainage, are clearly set out.

The conclusions of Fournel, very strongly framed, show a bias against dilatation in peri-uterine lesions. He points out that the normal uterus, if tamponnaded, gives forth a discharge; that dilatation cannot possibly touch many of the diseased states of the annexa; he disagrees with Doléris as regards the success and efficiency of the treatment. While allowing for its indication in non-suppurative conditions suitable for expectant treatment, he condemns it in suppurating lesions, and emphasizes the caution that dilatation causes indirect mischief to the general health as well as to the pelvic organs. He asserts that the fatal results of such radical operations as oöphorectomy and hysterectomy have their mortality increased by previous dilatation. Bonnet, on the other hand, agrees with Walton, Poullet, Doléris, Labadie-Lagrave, and others, on the efficacy of dilatation, curettage and drainage in salpingitis, and in affections of the adnexa complicating displacements of the uterus. He says: 'I have never seen a fatal result, nor any aggravations of the lesions of the appendages, when the treatment has been carried out properly and gradually.' In recent cases of cellulitis, and in cystic conditions of the endometrium, he advocates dilatation.

The truth regarding dilatation and curettage may be placed as midway between the views of its advocates and opponents. In such capable hands as those of Olshausen, death has followed from dilatation; and that, even with the greatest care and complete antiseptic precautions, alarming symptoms may arise consequent upon its employment, has been proved to myself. This I have shown in a case in which pelvic abscess followed. True, I have never had in my own practice a fatal issue, but I have thus emphasized the unfavourable possibilities of the procedure, in order to draw attention to the unavoidable risks that are occasionally associated with it, especially if it be carried out without stringent aseptic precautions.

Some Remarks on Sutures and Ligatures.

Substances used for Sutures.

Sutures may be of silver wire, silkworm-gut, silk, catgut, or chromicized gut.* Of these *silver wire* has the advantage of being more completely aseptic. On the other hand, it is often unsuitable for application in consequence of the tendency to cut the tissues, to break, and from the time taken in adapting them. Their twisted or cut ends are apt to wound. They are, however, employed by many in operations on the vagina or perinæum, in combination with the perforated shot or metallic button. The *silkworm-gut* is tough, rather rigid, and is impermeable; it has the disadvantage of irritating the tissues through the cut ends. I never use silkworm-gut for buried sutures. I believe it to be the best kind of suture for uniting the margins of the skin wound, and I invariably use it for this purpose. It should be sterilized and soaked for a considerable time previous to use in a solution of carbolic acid or perchloride of mercury. *Silk-woven sutures* of different thicknesses are those most commonly used, and also are best adapted for the greatest variety of circumstances under which they may be required. The drawback of silk is its possible proneness to favour septic action through its porosity. On the other hand, it is itself generally absorbed. The thicker threads of silk—as is also the case with catgut—are liable to remain, and form sinuses in the deeper tissues. Fine silk answers well for suturing the bowel, the peritoneum, ligaturing bleeding-points and vessels, tying adhesions, and the closure by superficial suture of the integument.

The Catgut Suture.

For most operations in which buried sutures are required, my preference is for catgut, properly prepared in the manner I have described. There is, however, a great divergence of opinion amongst operators as to the superiority

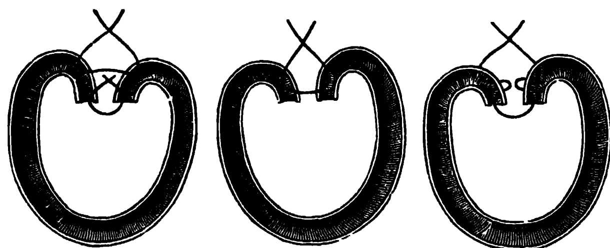


Fig. 163.—Czerny's Suture. Fig. 164.—Lembert's Suture. Fig. 165.—Gussenbauer's Suture.

of silk or catgut. Martin, for example, uses catgut almost entirely for his vaginal operation. Schauta prefers silk, also Doyen. Pozzi, on the other hand, thinks that, both from the point of view of its toleration by the tissues and that of its final absorption, good catgut is superior to silk, and that in

* I use sterilized horse-hair occasionally for the skin. It is a favourite suture or this purpose with Doyen.

all cases where it is unnecessary to place sutures which must remain for a length of time in order to secure permanent union, catgut should be substituted for the silk; while, on the contrary, he prefers the latter in suturing the intestine, the stomach and the bloodvessels. In consequence of secondary infection and resulting sinuses, he would give the preference to catgut for ligatures and silkworm-gut for sutures, especially for operations in pyo-salpinx and pelvic abscess. And, for the same reason, he considers that sutures in the abdominal wall, or in contact with a drainage-tube, should not be made with silk, but with the silkworm-gut or silver wire. There is not, he says, in general surgery and gynæcology any other kind of suture or ligature that can compare with catgut. The property which it possesses of being dissolved and absorbed in a space of time varying from eight to ten hours, dependent upon its thickness and mode of preparation, makes it invaluable for buried ligatures in the abdominal cavity, for sutures of the abdominal neck, the vagina, and for plastic operations, where removal of the threads is difficult, and often painful.

Of kangaroo tendon, introduced by Marcy of Boston, I have no personal experience. It is stronger than catgut and more slowly absorbed. Whatever be the nature of the material used, the security we desire to obtain as regards tenacity of grip, and protection against sepsis, will depend upon its preparation, and this has been already fully entered into.

I think we may safely say, so far as gynæcology is concerned, that catgut is the most useful material, both for ligature and sutures, though I have frequently used it for the pedicles of ovarian cystoma, and constantly in oöphorectomy. For the latter I generally employ silk. Catgut prepared as I have directed, according to Martin's method, with sufficient time allowed to elapse before it is used, provided that it is of sufficient thickness, is easily and rapidly tied, does not slip, does not cause stitch abscesses, and resists absorption for a sufficient length of time to prevent any fear of hæmorrhage. Fine silk should be used for the ligation of smaller vessels, for suturing the peritoneum, omentum, or intestines. Medium silk should be employed for the larger vessels, for tying adhesions, small pedicles, and uniting muscle and fascia. The thickest silk should be kept for use in securing larger pedicles, tying off the broad ligaments in vaginal hysterectomy, and for traction purposes in manipulation of the uterus in hysterectomy. Silk is also to be used in amputation of the cervix, and by many is preferred in suspension of the uterus and hysteropexy. Personally, I prefer catgut for these operations.

For plastic operations, silk or silver wire will be chosen according to circumstances, and the latter is to be chosen for lacerations of the uterus and the closure of most fistulæ. For the radical cure of hernia I prefer catgut, silver wire, and silkworm-gut.

With regard to special sutures, a brief reference to the most important employed by the gynæcologist must be useful to the surgeon. The subjoined figures and those which follow them are taken from the valuable work of Pozzi.*

Figs. 163–165, from Pozzi, represent the three well-known methods of Czerny, Lembert, and Gussenbaur of suturing the intestine.

Pozzi divides the remaining different forms of suture as follows:—

À Points Séparés.
Simple Continuous.
À Étages.
The Mixed Suture.
The Quill Suture.

The Suture 'à Points Séparés.'

The principle of this form of suture is to secure complete coaptation of the sides of the wound by passing three threads at different distances from its margin, from one side to the other of it. The first of these, the farthest from the edge, is passed deeply and completely beneath the exposed surface, and is brought out at a corresponding point on the other side. The second is not carried altogether underneath, but appears crossing a portion of the wound; while the third, or most superficial, simply binds together its divided margins. The deepest sutures (those first passed) are tied last.

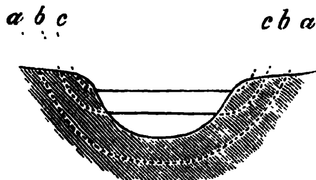


FIG. 166.—POSITION OF THE THREE THREADS IN THE SUTURE 'À POINTS SÉPARÉS.

Simple Continuous Suture.

This is made by securing one end of the gut or silk with three knots at an angle of the wound. This terminal point of the gut or silk is held in a forceps by an assistant; the gut is now carried in continuous loops at a distance of two millimetres from the margin of the wound until it arrives at its other end, being drawn fairly tight. A little care is required that the consecutive stitches are adjusted with equal tightness.

Suture à Étages.

When the simple continuous suture is obviously insufficient from the size or depth of the wound to close it, this variation is suggested. When it has reached the widest portion of the wound, the thread is carried, not through the margin, but at some distance through the deeper tissues in the same continuous fashion, thus diminishing its width for the extent desired by the operator. The needle is then again carried through the superficial structures,

* 'Traité de Gynæcologie.'

the wound being finally closed by a further continuation of the original suture. In some instances it may be necessary to insert two or three of these

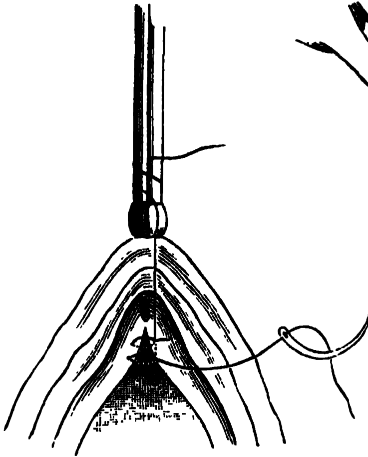


Fig. 167.—Simple Continuous Suture commenced. Forceps holding the detached stitch at the angle of the wound.

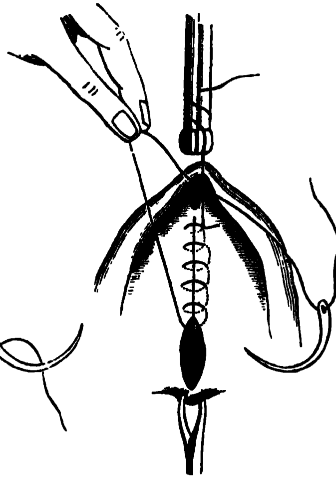


Fig. 168.—Continuous Suture nearly finished.

superimposed threads in the centre of the wound, in order to sufficiently contract the deeper tissues. Care must be taken not to draw the sutures too tightly, and thus to approximate too closely the separate stitches.

In passing the sutures, should the thread be either cut or broken, another is inserted at the same level, knotted, and the stitches are continued. Pozzi recommends, where the tension is great, the insertion of a few separate superficial stitches of silver wire or catgut.

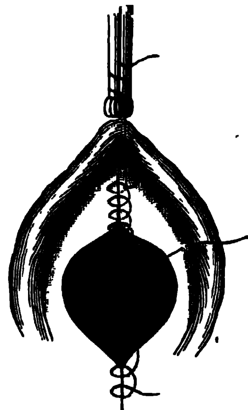


Fig. 169. — 'Suture à Étages.' Three overlying sutures in the middle of the wound.

The Mixed Suture.

This is a combination of the suture *à points séparés* (already described) and the continuous suture. Pozzi employs it in closing the abdominal wound after laparotomy. Having taken the usual precaution to protect the omentum and bowel, the margins of the abdominal wound are drawn together over the protecting sponge. The peritoneum alone is stitched, from the lower to the upper end of the wound, when, the sponge being withdrawn, the suture is next carried through the muscular

aponeurosis, the stitches being fairly close together. If required, the sheaths of the recti muscles are closed. When the second stage is completed, space being left at the lower margin of the wound for the pedicle with its elastic ligature, the skin and subcutaneous tissue at either side are brought together by a series of separate stitches about three centimetres apart, the needle entering at two or three centimetres from the edge of the wound. Finally, with a fine needle and thin catgut or silkworm-gut, a fine superficial suture is placed between each of the deeper ones, quite close to the edge of the integument. These latter are first tied, and then the deeper sutures. The third stage is now completed.

The Quill Suture.

Pozzi prefers small rolls of iodoform gauze as quills in the use of the quill suture; and in certain cases, after ablation of very large abdominal tumours,

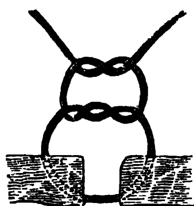
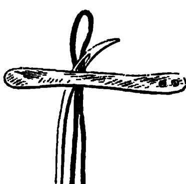
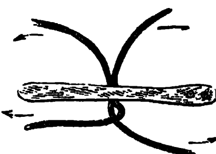


FIG. 170.—SURGEON'S KNOT.





FIGS. 171, 172.—ORDINARY LOOP-KNOT FOR PEDICLE. Fig. 171, Passing of loop before withdrawing needle; Fig. 172, Crossing of threads. (Doran.)

he uses long and deep sutures, which are retained by rolls of iodoform gauze folded over the abdominal wall. They serve as efficacious means of com-

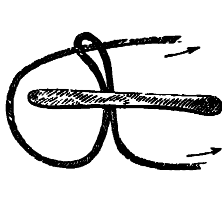


FIG. 173.—BANTOCK'S KNOT.

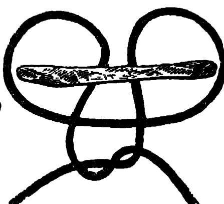


FIG. 174. — TAIT'S 'STAFFORDSHIRE' KNOT.

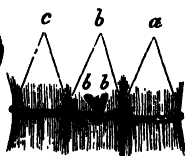


FIG. 175.—CHAIN LIGATURE ON PEDICLE, THREADS CROSSED. (Doran.)

pression, and tend to prevent hæmorrhage and serous exudation. The sutures may be removed in from five to six days.

Ligatures.—Pozzi makes some valuable observations also on ligatures.

While silk is most generally used for ligaturing *en masse*, there can be little doubt that the abandonment of a large number of threads in the peritoneal cavity is not without its dangers. Some operators, as Vert, Martin, and others, relinquish silk altogether in favour of catgut for intra-peritoneal ligatures.

Fig. 170 represents the surgeon's knot made; Fig. 171, the method of

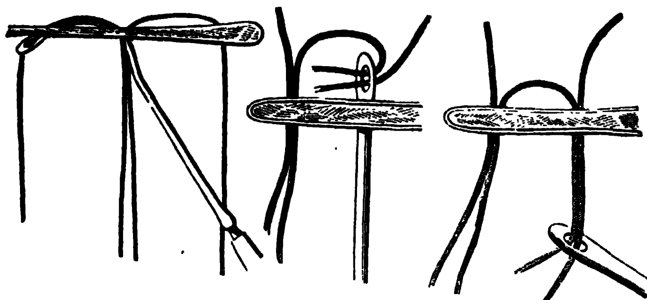


Fig. 176.—Chain Ligature being applied on a Membranous Pedicle.

Figs. 177 and 178 show the Method of making Consecutive Loops of the Chain Ligature.

tying the pedicle by piercing it with a double thread, which is then cut, and both ends knotted, as shown in Fig. 172; or the thread is passed through the loop, as is done by Bantock (Fig. 173); or the 'Staffordshire knot' (Fig. 174) of Lawson Tait is adopted. In this latter the pedicle is transfixed with a blunt-pointed or aneurism needle armed with a double thread. The

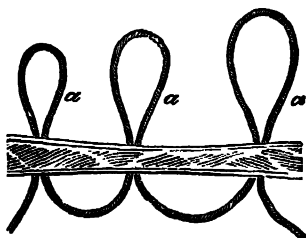


Fig. 179.—Loops of Chain Ligature. *a*, *a*, *a* mark the points where these are cut for knotting.

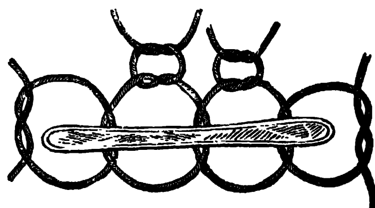


Fig. 180.—Showing the Threads crossed, knotted, and ready for tightening.

needle is not withdrawn. Through the loop thus formed are brought the ends of a ligature carried loosely round the pedicle. The needle is now withdrawn, by which means the ends of the pedicle ligature are brought back through the pedicle and lie above their own loop. One of these ends is passed under the loop, and both are tied firmly. They are again carried round the pedicle, and once more firmly tied.

Chain Ligature.—This form of ligature is useful in flattened pedicles, and in tying membranous adhesions. Figs. 173–180, show sufficiently the method of tying these.

Mattress Suture.

Another admirable form of buried suture is the mattress suture. It is made with silver wire. Its typical use is in closing the muscular tissues and fascia in the operation for hernia. Two needles are threaded with the wire. One is darned once through the tissues at one side of the wound, and is then brought out and passed through the structures at the opposite side; the other needle is passed in a similar manner, and a loop is thus left at one side. Similar loops to the number required are then passed. The free ends of the wire are next pulled together, twisted, and cut off close.

CHAPTER VII.

DISORDERS OF MENSTRUATION.

AMENORRHŒA AND LEUCORRHŒA.

To the student a short classification of abnormal menstrual states may be acceptable.

Amenorrhœa: 1. Primary, frequently persistent (emansio mensium).

2. Secondary, usually temporary (suppressio mensium).

Dysmenorrhœa:—

Ovarian, due to	Congenital abnormalities Congestion and obstructive congestion Ovaritis Apoplexy Changes in corpora lutea Cystic degeneration Cortical and interstitial sclerosis Gonorrhœa Cirrhosis Adhesions.
Tubal, due to	Congenital abnormalities Inflammation Adhesions Displacement Strangulation Cystic disease.
Uterine, due to	Congenital malformations Version and flexion of the uterus Stenosis of the cervical canal Interstitial fibroids Polypi Traumatic causes (results of operations) Endometritis.

Atresic -	Atresia of Fallopian tube " uterine canal " vagina " vulvar orifice.
Membranous -	A special form of uterine dysmenorrhœa.

Metrorrhagia: 1. Catamenial excess (either simple excess in the normal physiological and pathological process, or the result of a morbid condition of the ovaries, uterus, or other organ, as the heart or liver).

2. Climacteric; occurring at the menopause.

Metrorrhagia: Abnormal flow of blood during the intervals between the menstrual acts.

3. Vicarious (diverted)—pneumonic (hæmoptysis); nasal (epistaxis); gastric (hæmatemesis); cutaneous; renal (hæmaturia); cerebral and retinal; rectal.

AMENORRHŒA.

Causation.—1. Removable causes (excluding pregnancy), many of those cited above as influencing ovulation and menstruation.

2. Irremovable causes—absence, or congenital malformation and arrest of development, of the ovaries, Fallopian tubes or uterus; acquired disease of the ovaries or uterus.

We find that the commonly occurring causes associated with a diminution or temporary absence of the menstrual flow are :—

(*a*) Anæmia and chlorosis;

(*b*) Plethora;

(*c*) Some accidental influence operating on the woman, as mental shock, fright, cold, sea-bathing (all these repressing causes have a more decided effect if they occur at or about the time of a menstrual epoch); acute and chronic wasting diseases; the exanthemata;

(*d*) Congenital.

Differential Diagnosis from Pregnancy.—As it is the rule, though there are occasional exceptions, that the menstrual flow ceases during pregnancy, it is always our duty, in any suspicious case, most carefully to exclude any chance of this condition being the source of the trouble. The student of midwifery has already studied all the signs and symptoms of the pregnant state. He is aware how difficult it is, before the uterus rises above the pubes, to speak with any degree of confidence of the existence of pregnancy.

On no question must we guard our expressions or our suspicions more than on this.

A lady consulted me to ascertain whether she was pregnant or not, as she was desirous of taking a long holiday trip, and would not venture if she were. There had been a gap of one month, and then two slight periods. She volunteered the information that she had consulted a doctor, and he told her, *after examination with the uterine sound*, that he believed she was not enceinte. She also told me that she had domestic reasons for not wishing to have a child. The means used in diagnosis should at least have solved for her this little difficulty.

Both in those cases in which the possibility of conception is for any purpose concealed or denied, and in those in which the desire of the woman is parent to the belief, and she assumes that she is or is not pregnant, is this caution necessary. It requires considerable tact to avoid committing one's self to an opinion until such a period of pregnancy has arrived when we are able to speak with confidence.

I do not enter fully into the differential diagnosis of pregnancy; this is exhaustively done in every treatise on midwifery. This table of the most important proof, divided over three periods, may be of service:—

FIRST PERIOD.	SECOND PERIOD.	THIRD PERIOD.
Cessation of the menses; reflex and sympathetic disturbances; changes in the breasts; morning sickness; enlargement of the uterus and altered position, with commencing change in the os uteri and cervix; vaginal signs in alteration of colour and increase of natural secretion.	Progressive increase in the size of the uterus, which continues until the close of pregnancy, with characteristic alterations in the abdomen; further changes in the breasts (areolæ—secretion); fœtal projections and heart-sounds; ballottement; placental souffle.	Uterine contractions well felt; more characteristic changes in the os uteri and cervix; all the signs of pregnancy becoming more manifest.

Hegar's sign consists in the uterus losing its pear-shaped outline; 'the body is bellied out over the cervix in all the transverse diameters, especially antero-posteriorly.'

It may be accepted as a general rule, to which we have occasional exceptions, that we are correct in surmising that a married woman in fair health, who has ceased menstruating, and has an enlarged uterus and softened os and cervix, is pregnant. We must not,

however, be too ready to be influenced by her own assertions that she has menstruated, or, rather, thinks she has, and thus be too quickly led into passing the sound. Women mistake other blood discharges for those of menstruation, and the existence of pregnancy is not to be negatived because a woman has had even severe losses. I have known the pardonable error made more than once of the sound being passed for an assumed hyperplasia, and abortion follow. In both cases the woman ridiculed the idea of pregnancy.

Referring to Hegar's sign, the following observations of Charles Noble are of practical moment:—

'Within six weeks after the beginning of pregnancy the ovum has grown sufficiently to cause the corpus and fundus of the womb to assume a distinctly spheroidal shape. As during this time the cervix has altered very little in its form, we have present, to make use of geometrical terms, a spheroidal body posed upon a cylinder. If one will picture this state of affairs, he will see that the sphere juts out from the cylinder prominently and in every direction. In other words, when examining the pregnant uterus between the sixth and twelfth weeks, the uterus will be found enlarged to correspond with the period of the pregnancy; the corpus and fundus will be found as a spheroidal body, and the corpus can be easily made out as jutting boldly out from the cervix in front, behind, and at each side. In my experience this sign is of the utmost value and absolutely reliable. The judicious practitioner, however, will not neglect to make use of corroborative signs and symptoms. The spheroidal body of the womb will be found softened, and as it is held between the two hands in bimanual examination, a feeling of semi-fluctuation can easily be made out. This softening and the semi-fluctuating should be found in all cases.

'It is well to say a word about conditions which prevent the examiner from making out this characteristic sign of pregnancy. It will be readily seen that if pregnancy should occur in a womb which already contains a fibroid tumour, the sign is not available. This is equally true when the pregnant uterus is jammed in between tumours of the ovary. Extreme development of adipose tissue may prevent its recognition, on the one hand by making the abdominal hand unavailable, or on the other by preventing the examining finger from reaching high enough up *per vaginam* to make out the form and consistency of the uterus. It will occasionally happen also that pregnancy takes place in a womb bound down by adhesions, in a pelvis in which the structures are distorted as the result of former inflammatory processes. In such cases the development of the pregnant womb is frequently atypical. All the conditions described have been encountered, and my remarks concerning them are based upon experience. In such cases the examiner usually finds enough to awaken his suspicions, but not enough to form a positive diagnosis, and thus is obliged to reserve his opinion.'

From the fifth to the sixth month, in the great majority of cases, we can speak with confidence of the uterine enlargement being due

to pregnancy. Yet, remembering how often we meet with such pregnancy complications as fibroid tumours, ovarian cysts, ascites, flatulent distension, or hydramnios, we had better keep always before us the fact that *the only absolute proof and infallible test of pregnancy is the auscultatory one of the fœtal heart-sounds.* In all the others a man may be deceived. This must be so, or we should not have the greatest gynæcologists committing the error of opening the abdomen for a tumour, ovarian or uterine, or performing the operation of paracentesis abdominis for ascitic accumulation, to find a pregnant uterus. Nor would we find the awkward mistake made in the opposite direction—woman, nurse, and practitioner awaiting the discovery of a phantom pregnancy and flatulent accumulation.

Anæmic and Chlorotic states are easily recognized in the pale conjunctiva, the colourless lip and gum, the white complexion; and in marked leukæmia, the wax-like look of the skin, the anæmic first sound and functional irregularities of the heart, the jugular pulse or bruit, the pale retina, the puffy state of the face and eyelids, and the accompanying group of neuralgic or hysterical symptoms constantly associated with these physical signs. Most marked of these are headache, loss of appetite or capricious tastes in diet, lassitude, dislike for outdoor exercise, sleeplessness, neuralgic pains in different places, attacks of syncope, and a rather characteristic pain referred to the left side of the chest beneath the region of the heart. It is in such a general depraved state of the system that we are often consulted. The watery blood, with red corpuscles diminished in quantity and altered in their physical characters, does not respond to the demand of ovary and uterus; the vitality and nutrition of both organs are lowered. The act of ovulation gradually ceases, or may not occur at the proper time, or it is abortive and irregular, while the menstrual discharge is lessened, changed, or absent.

Plethora.—Just the reverse of this condition is met with in *the plethoric* and full-blooded. Here there is a hyperæmic condition of all the sexual organs. They participate in the general state of plethora of the entire system, and the other vital organs. The normal balance of blood-supply and nutritive growth and development is lost; congestion of both ovaries and uterus results. The act of ovulation is either prevented or arrested through this undue blood-supply; or it becomes at first irregular in time of occurrence, and in the quantity of the menstrual secretion, and, gradually interrupted, it finally ceases. This type of case is easily recognized. The ready flush, the high complexion, the throbbing vessels, the

strong and full pulse, with accompanying symptoms of headache, functional heart palpitations, proofs of congestion elsewhere in the lung, kidney, or retina, are a few of the signs that tell us of the cause of the amenorrhœa.

Accidental Influences.—We find these in injudicious habits of dress, diet, exercise; in some mental shock; in the sequelæ of various acute diseases which have lowered the vitality of the system, or interfered at the time of its occurrence with the menstrual function. If we go carefully into the history of any case when first we are consulted, we can generally place our finger on the fault which has, directly or indirectly, led up to the cessation of the menstrual flow, or its altered character. And in many cases that come before us, it is to a depraved mental condition we must look for the primary source of the evil.

Congenital Defects.—When we are consulted by parents, or by the patient herself, for delayed menstruation, before making any internal examination it is well to enter carefully into the previous history. We can ascertain if there have been an indication at any time of an effort at ovulation, such as recurrent pains in the back or sides, or an attempt at periodical discharge of any kind; if there be a general arrest in development in the direction of womanhood, both physical and mental; or if we can trace to any accidental cause the arrest or suppression of the flow. If not, we must keep before us the probability of congenital defects in ovaries, uterus, and vagina. If ordinary remedies fail to produce any effect, a careful digital examination in *the presence of the patient's friend or nurse* may be called for. By its help we may decide the question of congenital defect. Such an early examination is especially demanded in young married women, and in the unmarried, particularly if we have a history of old attacks of vaginitis, uterine displacements, pelvic peritonitis, or more urgent symptoms indicative of retained menstrual flow.

Indications for Treatment.—These, once we decide the cause of the amenorrhœa, are clear. In anæmia—in the first instance, to restore to the sexual organs their normal blood-supply, and correct the constitutional vice predisposing to this morbid state; and secondly, to apply to these organs such local therapeutic means as are calculated to induce or re-establish the natural performance of their functions. We must correct those habits that have a deleterious influence on the general health, and on the sexual organs in particular.

Questions of clothing, diet, exercise, mode of living, and occupations, have all to be carefully gone into. The use of warm clothing; the wearing of light flannel next the skin (vest and drawers); the avoidance of modern devices for strangling the abdominal and pelvic viscera; the securing of due warmth in the extremities, both hands and feet; proper support for the under-clothing—all must be insisted on. It is a good plan for the practitioner to give each patient her individual diet table systematically arranged, omitting all those articles of food which are calculated to cause or sustain dyspeptic states, and which are in themselves likely to deprave the blood. Sufficient quantity of animal food should be given, if necessary, in any of the forms of liquid and concentrated foods, or poultry, game, fish, and milk, according to the digestive powers of the patient; moderation in ordering alcoholic stimulants is advisable, avoiding their careless recommendation or a fanatical denial of their therapeutic value.

Attention to the times of meals and the intervals between them is of equal importance to their character. Speaking generally, light and digestible meals, not taken at long intervals, and never late at night, will be found most judicious. We must correct, when possible, those pursuits and their effects which tend to corrupt the blood. Overcrowding in sleeping apartments, heated rooms, ill-ventilated sitting and bed rooms, prolonged sedentary employment, much stooping or standing, excessive study and long school-hours, want of suitable outdoor exercise and amusement, sustained and violent muscular exercise, as now frequently taken in cycling, have to be firmly condemned.

The Dangers of Cycling.

The rage for cycling which has developed among women of all classes within the last few years, must seriously affect, according as the exercise is abused or otherwise, their health. This may be looked at from two points of view: either from that of its influence on the general health, and thus indirectly on the sexual organs and generative functions of the woman, or, more directly and immediately, on those organs themselves. I have seen many cases in which imprudence, both in the distances ridden and in the speed of riding, has impaired the health, causing both irregularity and irritability of the heart's action, and inducing general constitutional weakness, and, in some instances, anæmia. Obviously, prolonged pressure on the external genitals must affect all the parts from the coccygeal structures to the os pubis. Sufficient time has as yet hardly elapsed to enable us to form any accurate opinion on the permanent effects that may follow in a certain

proportion of cases from the constant use of the bicycle. There are however, some points on which it is right to caution women and young girls who may be over-enthusiastic in the use of the wheel. Many women of advancing years are learning to ride. During the period of the menopause, more especially if they suffer from disturbances in the menstrual functions, cycling may have deleterious effects, and should not be practised without advice, certainly never when there is a natural or erratic epoch present, or if the heart be functionally affected or the patient anæmic. Those who have backward displacements, or who suffer from prolapse, must be careful in riding, if, indeed, they ought to do so under any circumstances. Younger women who suffer from menstrual irregularities and displacements, or any degree of prolapse, had better not ride while under treatment. There may be exceptions to this rule, but they must be regulated by the individual peculiarities of each case, and by medical advice. The young girl who is anæmic, with functional hæmic bruit, should not ride, or should at least be cautioned not to do so to the point of over-exertion or fatigue. All 'scorching' should be discountenanced. Women afflicted with hæmorrhoids should not ride. Women now ride so well, and are taught so generally to maintain the erect position in the saddle, that it is hardly necessary to refer to the danger of the forward attitude, and there can be little doubt that the saddle with the falcon pummel may prove a serious source of sexual excitation. The character of the saddle is a matter of great importance to the woman cyclist. A good *pneumatic* saddle should be so constructed as to support well the ischia; it should not press on the external genitals or the coccyx, while there should be no projection under the pubes. We have thus emphasized some of the precautions that must be observed by those who cycle, but the benefits which are derived from this exercise by the great majority of women who indulge in it are not to be under-estimated.

Cycling practised with moderation is a healthful recreation and exercise, attended with most desirable physiological effects on the woman, both mental and physical. It enables many women to enjoy open-air exercise who would otherwise be deprived of it, and for many of the cases in which in the past vicarious exercise in the shape of 'massage' has been recommended, offers a much more satisfactory substitute. The perfect stationary bed-chamber cycles which are made in France can be well used by those who are not in a position to travel on the ordinary machine.

Boarding Schools.

How many of the future uterine troubles of adult and married life are engendered by the routine overwork of the modern boarding-school, when the mother's watchful eye is absent, only those who are so frequently consulted for the pernicious consequences know. Care bestowed on the regularity and character of the catamenial periods is not the least important of the duties that are imperative on the principals of schools. If parents were often more alive to the danger, they would be more careful in the selection of the temporary

home, on the domestic management and control of which so much of their child's future happiness depends.

Nor must we omit due attention to the cutaneous secretion—proper bathing of the entire body at a medium temperature (water 60° to 70° or 80°), if cold be not well borne, should be encouraged, also sea-bathing if it agree, and if a healthful reaction occur after it. Proper friction is essential, especially of the lower part of the back and the abdomen, after the bath.

A capital sea-water bath may be made by adding a few ounces of the essence of seaweed (Harvey's, Margate) to twenty gallons of warm or cold water. This preparation may be obtained through any chemist.

Atthill suggested a plan which I have often followed with success. The patient is directed before she goes to bed to sit, protected from cold, in a small bath of water at a temperature of from 60° to 70°. The feet are either placed in hot flannel or in a small foot-can of hot water. After the bath the hips and lower part of the abdomen are well rubbed with a Turkish towel, and then the patient goes immediately to bed. Such spas as those of Kissingen, Schwalbach, Spa, Royat, Kreuznach, may be resorted to. A winter at St. Moritz, or Davoz Platz, or in the Canaries, if any tubercular tendencies be present, may be necessary, according to the nature of the case. For anæmic girls Schwalbach is the spa I have the greatest confidence in, and the results have been all I could desire in the cases I have sent there. Spa is preferred by some as the journey from England is not so long.

For those who cannot afford to go abroad in the summer, we have a full selection in our British health resorts, according to the season of the year and the nature of the case. There is an admirable iron spa at Felixstowe, and also at Tunbridge Wells. Strathpeffer I have had good results from. This course will often, if assisted by proper treatment and regimen, restore the health and arrested functions, when nothing will effect any change in the impure atmosphere of the crowded city.*

I briefly tabulate the most important therapeutical means for the treatment of amenorrhœa generally, reserving a few practical observations on some of the more useful of these drugs :—

Iron (and its salts).
Arsenic.
Quinine.
Nux vomica and strychnine.
Ergot and ergotine ; ergole.†

Chalybeates generally.
Separately or in combination.

* See Appendix for a list of the more powerful spas.

† "Ergole" is a sterilized triple extract of ergot, containing 2½ grs. of ergotin

Aloes. } In combination with iron.
Myrrh. }
"Celerina."
Aletris.
Tincture of viburnum, and viburnum extract.
Borax.
Permanganate of potash—Dioxide of manganese.
Cannabin tannate.
Aletris farinosæ extract.

Other Therapeutic Means.

Galvanism, combined with properly applied massage.
Internal faradization.
Warm hip and foot baths.
Friction to spine.
Leeches to anus and inside of thighs.
Fomentations to the breasts.
Stimulating enemata.

Iron.—Before administering any form of iron, it is well to prepare the system for it. This is best done by the exhibition of some gentle saline aperient for a short time, such as a natural aperient water, or any of the effervescing saline preparations in ordinary use. For a few days before commencing the iron, an alkaline mixture, of bicarbonate of potash, or Mindererus' spirit (liquor ammoniæ acetatis) with spiritus etheris nitrosi—the simplest and best saline combination of all—may be prescribed. The diet should be regulated, and heavy meals avoided. Farinaceous food, with milk, should be taken. Sufficient time should be permitted to elapse after meals before the iron is administered; it should not be given while fasting. The particular preparation selected must depend on the features of the case, or the tolerance shown for the exhibition of iron, and the exact effect we are anxious to produce. The preparations I find most efficacious are hæmoglobin in troches or syrup, reduced iron, which can be given in pill or powder, alone or in combination; dried sulphate of iron, which can be combined with quinine, arsenic, or nux vomica in pill; the dialysed solution of iron; the compound iron mixture; tincture of perchloride of iron; the solution of the chloroxide of iron; the compound forms, ammonio-citrate and

in each 5 minims of the fluid. It is less liable to cause inflammation in deep sub-cutaneous injection than ordinary ergotin (Oppenheimer).

potassio-tartrate; the effervescing granular preparations in combination with quinine; bromide of iron, when we want iron in conjunction with the bromides, is useful. I have found such preparations as those of Blaud and Blanchard (pills) or the jelloids of Warwick borne when other forms of iron were not tolerated.* The phosphatic compounds (syrups of the hypophosphites of iron and quinine), Fellows' and Easton's syrups, or any of these combinations, Schwalbach, Flitwick,† or Spa), and the preparations of ferrated maltine and beef-iron wine.

Young anæmic patients are best treated by administering a little Flitwick water with food, and a Warwick's jelloid given with an arsenic and iron pill (in the form and strength recommended below, about a quarter of an hour after the meal. St. Raphael wine is excellent in anæmia, taken with food, and Stearn's wine of the alkaloidal extracts of cod-liver oil I have found most valuable, a small quantity being given on sitting down to a meal.

Arsenic, through its action on chronic uterine inflammatory states, is perhaps the most useful medicine we possess. The arsenious acid ($\frac{1}{36}$ to $\frac{1}{50}$ of a grain) may be well administered in pill, in conjunction with either quinine or iron, three times daily after food. Fowler's solution, as a fluid preparation and capable of combination, answers well. The peculiar susceptibility of some individuals to the effects of arsenic, as seen in irritability of the stomach, erythematous attacks of the skin, and inflammatory conjunctival states, is not to be forgotten when we are giving it for the first time to a patient.‡ *Quinine* we may combine in administration with any medicine indicated for amenorrhœa. It may be given either with arsenic or iron, aloes and myrrh, ergotine, or nux vomica in the form of pill, or with various effervescing salts of iron; or the vegetable infusions, and any of the many elegant forms in which quinine is now prepared. The hydrochlorate of quinine, when we wish, can be conveniently given with the tincture or solution of the perchloride of iron.

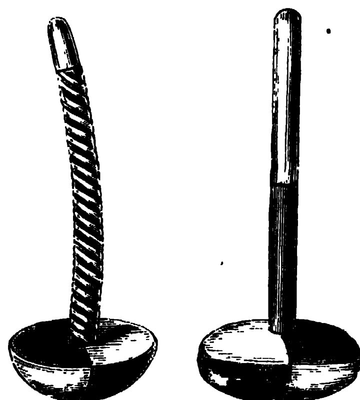
* The palatinoid form of Oppenheimer is an admirable method of giving these iron preparations. These palatinoids should not be given until almost an hour has elapsed after a meal.

† This Bedfordshire Spa water is an admirable chalybeate—a tablespoonful is sufficient with meals. The liq. arsenicalis can be given with it.

‡ The Bipalatinoids I order contain—

Ferri sulph. exsicc gr. i.
Quinæ sulph. gr. i.
Acid. arsenios, gr. $\frac{1}{36}$ to $\frac{1}{50}$.
Ext. nucis. vom. gr. $\frac{1}{8}$.
M.

Nux vomica or strychnine, next to quinine, is perhaps the most valuable vegetable tonic we possess; more especially it is of service in the atonic and debilitated conditions associated with suppressed menstruation.* It may be taken in the form of extract, with either quinine, arsenic, or iron, in $\frac{1}{6}$ to $\frac{1}{4}$ grain doses, three times daily, after meals, or at times combined with ergotine. It is particularly indicated in those sluggish states of the bowel that we so frequently find complicating amenorrhœa. Here it can be added to an aloetic pill. But the most reliable mode of administering this drug is as the liquor strychniæ of the Pharmacopœia. It is better to prescribe a standard quantity, so that the ordinary half-ounce dose contains $\frac{1}{40}$ of a grain. With glycerine and the dialyzed preparation of iron it forms an excellent mixture, to which the tincture of quinine may, if we so desire, be added. *Ergotine*, as an emmenagogue, is a useful adjunct to any of these medicines. It can be given ($\frac{1}{2}$ gr.—gr. i. doses) with quinine and nux vomica. Ergot and most other therapeutic agents act chiefly as emmenagogues. Borax in 10 grain doses I have occasionally found of service. It is best administered by itself in the form of powder. Apiol capsules are of use, especially if there be dysmenorrhœa, and have a similar action to ergot. Dioxide of manganese, in the form of palatinoids, may be tried with advantage. With regard to the *uterine sound, before we take it up to induce a menstrual act, we must have positively assured ourselves of the absence of pregnancy.* Seeing the ill uses to which it is put, I do not like the idea of suggesting even its occasional employment as a means of treating ordinary amenorrhœa. I am certain that practitioners have a more efficacious means in electricity, though here, of course, the same rule holds good as regards the elimination of pregnancy. With the remarks on electro-therapeutics various vaginal and uterine electrodes are shown, and the methods of using these are described. I have abandoned the use of galvanic stems.


Barnes's. Rigid.
FIGS. 181, 182.—GALVANIC STEMS.

* Easton's syrup is conveniently given in the form of a palatinoid.

The different forms are to be seen in any instrument-maker's catalogue.

If one be inserted the uterine canal must be sufficiently dilated to permit of its passage, and the stem passed into the canal on a stem-introducer, either by the direction of the finger or the aid of the speculum. The patient should be placed in the semi-prone position and the duck-bill speculum used. The uterus may then be brought well under control with a uterine hook, and the stem inserted ; it ought not to be so long as to touch the fundus. It should be withdrawn if pain is complained of.

Some Special Therapeutic Agents.

St. Raphael Wine.—This wine should be given with food. It will be best borne if commenced in small quantities (℥i. three times in the day), and gradually increased.

Aletris Farinosa.—This drug will be found useful in cases of associated amenorrhœa and dysmenorrhœa, also in erratic menstruation; 20—30 drops of the liquid extract may be given alone, or combined with tincture of digitalis, or it may be combined with viburnum and caulophillin in palatinoid.

Aletris Cordial.—This patent preparation I have found of use in several instances, given either alone or in combination.

Viburnum Prunifolium.—The liquid extract of Viburnum Prunifolium and its tincture may be combined with advantage with both Aletris and Hydrastis.

Dioxide of Manganese.—This most valuable medicine for amenorrhœa, in anæmic and chlorotic cases, and in emansio mensium generally, may be given in gelatine pills, or in palatinoids, which I find more convenient. I give two palatinoids three times in the day (each palatinoid containing grs. ii. of manganese dioxide), also others containing gr. i. of senecin in addition.

Liquor Caulophilla (Pulsatilla).—I have tried this preparation on several occasions. Its effect has been variable. It has answered well in some cases of dysmenorrhœa with scanty flow. I have found it more efficacious when given in combination with '*Celerina.*' I can recommend this latter preparation not alone as an emmenagogue, but as a general tonic. I have frequently given it with vascular tonics, and with the best results. Celerina is well administered with Horsford's Solution of the Acid Phosphates, or the Syrup of the Hypophosphites. (Celerina contains celery, coca, kola, viburnum, grs. v.—ʒi.). Liq. caulophyllin et pulsatillæ are combined under the name of "colefina."

Santonine.—Whitehead and Hannah have found that santonine in 10-gr. doses is an efficient emmenagogue.

Seaweed Essence and Pine Baths.—An invigorating bath of seaweed essence may be made by adding a half-pint of the fluid to the 20—24 gallon bath. I have large experience of this preparation, and can most confidently recommend it (essentia algæ).

Pumiline Essence baths are very refreshing, as also are prepared pine baths.

Massage.—Massage is a powerful aid to treatment in amenorrhœa and dysmenorrhœa. It may be general, but more specially directed to the lumbar and sacral regions or the gluteal muscles. Its use may be combined with the warm bath of sea-salt or pine, and galvanism. The reader may refer for details of the massage treatment to the chapter on Massage.

Senecio Aureus.—This is a valuable drug. Its tincture may be given in combination with other remedies or the alkaloid senecin in the form of palatinoid.*

Leucorrhœa.

Of all terms used in gynæcology, this one—leucorrhœa—is employed in the loosest and most misleading manner, both by student and practitioner. By leucorrhœa we understand generally, in practice, what women call 'the whites.' If we restrict the use of the term to simple exaggeration of the normal secretions, whether coming from uterus, vagina, or vulva, or to some catarrhal state of the mucous membrane, it would be, perhaps, correct to speak of uterine, (corporeal and cervical) vaginal and vulvar leucorrhœa. But it must be remembered that simple excess of the normal physiological secretion rarely continues for a length of time without inducing pathological changes in the tissues, which are quite distinct from a slight perversion or simple exaggeration of secretion. Such a correctly styled 'leucorrhœal flow' we meet with, typically, in pregnancy, in young girls with debilitated constitutions, and in those suffering from anæmia. To mix up the idea of any pathological change in the tissues with ordinary leucorrhœa is simply to lead the practitioner into errors both of diagnosis and treatment. On the one hand, he may resort to unnecessary examinations, overtreat by local measures, apply topical agents to healthful structures, or raise unnecessary alarm. On the other, he may be tempted to pursue an expectant plan of treatment, hoping in vain that he can control a discharge which has its source in some diseased state of the uterus, by palliative measures and general constitutional remedies. I confine my observations to leucorrhœal discharges proper.

I have already, in the table of discharges, epitomized the distinctive features of the secretions poured from the uterus—body or cervix—the vagina, and vulva. In some cases simple leucorrhœal

* I have had palatinoids prepared containing lupulin, ergotin, caulophilla, and senecin, gr. i. of each (Oppenheimer).

discharge is very profuse; perhaps it altogether supplants the normal menstrual function. This form of discharge we are frequently consulted for in connection with either amenorrhœa or some irregularity of the menstrual flow, and its accompanying anæmic or chlorotic condition. We also meet with it as a symptom in gouty, rheumatic, syphilitic, and tubercular constitutions. In leucophlegmatic children, occasionally—apart from the discharge of vaginitis—after the exanthemata, or associated with worms, and during dentition, we find a true leucorrhœal discharge. Though in anæmic or chlorotic girls a vaginal examination is generally unnecessary, much careful discrimination has at times to be exercised.

There is such a contingency as the following: A very intelligent young practitioner brought to me an unmarried girl (accompanied by a married sister), suffering from amenorrhœa, with attendant anæmia, gastric symptoms, leucorrhœa, flatulence, etc. She had taken various remedies without avail. No examination had been made. I hinted at the possibility that she might be *enceinte*, but was assured it was out of the question. The chances of a flexion or version being present suggested a digital examination. I was surprised to find the girl far advanced in pregnancy. Insisting, then, on making a complete examination, we were satisfied she was at least in the eighth month of pregnancy. She had so laced and dressed as to deceive all about her, including her mother, married sister, and physician. The story tells its own moral.

When, from other symptoms, we are led to suspect some inflammatory condition, or a version or flexion, a digital examination is called for. In a married woman it is the safest course to examine the uterus when we are told that she 'suffers from the whites.'

Our treatment has to be determined by the general aspects of the case. The different modes of restoring the general health, by chalybeates, tonics, attention to diet, and exercise, already pointed out in the treatment of amenorrhœa, must be resorted to.

As to local measures, we may do much by the vaginal douche, astringent and alkaline injections, more especially those of alum, sulphate of zinc, sulpho-carbolate of zinc, borate of sodium. In children we must pay attention to the general health, and give some alterative, as small doses of rhubarb, hydrarg. c̄ creta and quinine; also, the various chalybeates—a course of syrup of iodide of iron, Fellows' syrup, or Parrish's food. The child's diet should be regulated, and she should have proper baths, sea-bathing, and warm underclothing.

Simple uncomplicated leucorrhœa rarely produces irritation of the

vulva, pruritus, or eczematous inflammation, while we frequently find such conditions attendant upon vaginitis and discharges of a purulent or acrid nature, both from the uterus and vagina. (See 'Vaginitis.') In children, however, scrupulous cleanliness should be enforced, and the vulvar orifice inspected regularly, lest there be any irritation consequent upon the discharge.

CHAPTER VIII.

DISORDERS OF MENSTRUATION (continued)— DYSMENORRHŒA.

PAIN.—Such pathological states as congestion, and associated obstruction, attended by more or less spasm, are constantly met with. In a large group of cases we find a tendency to amenorrhœa and scanty menstruation. The pain here is clearly associated with anæmia. In another the tendency is rather to plethora and congestion. So also the situations in which the pain occurs are variable; in the ovarian region, and along the inside of the thighs, if the ovaries should be, as is frequently the case, the organs most at fault; pain in the back and over the pubes, if the principal cause of the dysmenorrhœa lie in the uterus. Reflex pain in the head, chest, or abdomen, accompanying the local pain, is present, in some degree, in most cases of chronic dysmenorrhœa. Equally uncertain are the nature of the pain and the time of its occurrence. It varies from some slight aggravation of the common systemic disturbance antecedent to the menstrual flow, with pain referred to the back or sides, disappearing when the discharge appears, to the indescribable agony which the friends of the patient say 'they can only compare to labour pains.' The pain may precede the flow, and cease as this commences, or it may last all through the period, exhausting the woman physically and mentally. It is in such cases that the mind after a time is weakened, each period causing further prostration, until at last delirium is present, or perchance some permanent form of mental aberration results. The term 'hysterical' is often wrongly employed to describe the pain complained of in these cases; so also a special class of pain is loosely spoken of as 'neuralgic.'

Both terms are apt to mislead in practice. It cannot be doubted that a large amount of the pain complained of by some may be included in the general state known as hysteria, and with the type of pain looked on as neuralgic. And it is likewise true that the

mental condition of the woman leads her to exaggerate the suffering and describe it in extravagant language, while her weakened nervous system cannot sustain any acute or prolonged pain. This is still further accentuated by the recurring anticipation before each period. But if such considerations influence a practitioner to regard any form of pain as fanciful or unreal, and induce him to look on his patient as 'whimsical' and, as he is commonly pleased to say, 'hysterical'—though what he may mean by this latter generalization he would often find it very hard to explain—he will make a serious mistake. It may lead him to trifle with the source of the disorder in the ovary, uterus, vitiated state of the circulation, or depraved nervous system. *It is the safest rule in practice never to despise pain, no matter how trivial, and always carefully to seek for the cause of it.* Not the less must we do so because we feel convinced that our patient's mental powers are weakened.

It has been reported that women who have suffered agony from ovarian dysmenorrhœa were completely relieved by the deception of an incomplete oöphorectomy. When placed under chloroform, only the preliminary cutaneous incision has been made. I have seen the application of a metal disc over the ovary relieve ovarian neuralgia. Not long since I had a patient who, for some time, had had morphia injected subcutaneously for the relief of ovarian and other pains: she suffered from most severe dysmenorrhœa. Occasionally she craved for the morphia. By the justifiable deception of seeming to yield to her entreaty, while only pure water was used, she had a good night's rest, and expressed herself as completely relieved the next day.

We have no stronger proof of psychical influence over physical conditions than in the various applications of metallo-therapeutics, and the strange effects of metal discs applied for the relief of hysteria and hystero-epilepsy.

I by no means desire to be understood as doubting the conclusions of the late eminent French psychologist, Charcot. I think that in ocular therapeutics, and in the effects of the metals when applied for various retinal states, we have evidence of the direct physical results of metallotherapy. I refer to the work of the Salpêtrière physician rather to impress on the student's mind the double-sided nature of most ovarian disorders. On the one side, physical, from the slight congestive and hyperæsthetic to the various pathological conditions met with; on the other, psychical, as seen in all the so-called hysterica affections and states, complicating both the normal act of ovulation and any abnormal departure from the healthful performance of the ovarian function.*

* Consult chapter on Oöphorectomy.

Charcot originally took the view that the ovary is the *point de départ* of the paroxysm in the attack of hysteria and hystero-epilepsy—moderate pressure over the ovary inducing the aura hysterica, while more energetic compression arrests it, and also cuts short an attack, even when the convulsions have commenced. Pressure is made and maintained by the closed fist, which is pressed into the iliac fossa. Grailly Hewitt drew attention to the fact that this pressure also acts on the uterus, compressing its vessels, and diminishing uterine congestion. He regarded uterine displacements as having more to say to the hysterical phenomena than the dislocation of the ovary. Epileptic fits are sometimes stopped by pressure in *males* in the inguinal region. This acts on the sacral plexus of nerves, and the explanation is probably the same in some women.

From what has been said, it may be gathered that I regard as of doubtful scientific accuracy any classification which has been made of dysmenorrhœa; yet here, as in other efforts to classify affections between which no well-marked lines of demarcation exist, we gain much in clinical diagnosis and treatment from the grouping of ideas resulting from a classification, though it may not be critically accurate. Broadly, we keep always in our mind, in practice, the dysmenorrhœa which has its source in the ovary and its appendages rather than in the uterus. The pain is characteristically ovarian, and we seek for congestion, swelling, sensitiveness, a displacements of the ovary. There may be adhesions or effusions, and localized swellings in the broad ligaments or Fallopian tubes. On the other hand, we may find on examination, a satisfactory explanation of the suffering in the malformation of the uterus, in the congested cervix, the contracted uterine canal, some flexion or version, or an inflammatory state of the mucous membrane of cervix or fundus. The relation of ovary to uterus is too close to expect that this distinction of ovarian and uterine dysmenorrhœa should be clinically marked in a large number of cases. Thus we have the affected ovary reacting on the uterus, and any serious inflammatory affection of the latter organ influencing the former. But we are constantly meeting cases of dysmenorrhœa in which we can detect no mischief either in the ovary or uterus. They are normal in size, position, and freedom from adhesions; there is no fault in the patency of the uterine canal. Here we must look to the circulation or nervous system for the cause of the pain. This is traced either to the depraved quality of the blood, as in some anæmic state on the one hand, or to excessive blood-supply—a general plethoric condition of the system—on the other.

Pigmentation.—The pigmentary changes that occur contemporaneously with the menstrual act have been noticed by various writers.

At the Gynæcological Society in 1895 I quoted the following case :—

Vasomotor Coloration of the Face, with Pigmentary Changes associated with Abnormal Menstruation.—A girl, twenty-two years of age, suffered from the most severe dysmenorrhœa and oöphoralgia. This had lasted for some three years, and first came on after a shock. I saw her in 1895, being indebted to Dr. Roe Carter, of Sydenham, for the case. There was a conical cervix, with the ordinary pinhole aperture. I divided the cervix, and she wore an intra-uterine stem for a short time. The operation had no material effect on the dysmenorrhœa. Subsequently I tried both faradization and galvanism, also without effect. What I wish to draw attention to specially is the curious discoloration of the face, much more marked than in the ordinary menstrual chromidrosis or pigmentation of the lids. I have not seen any case recorded exactly like the one I refer to. On two occasions I have seen the cheek ecchymosed exactly as if it had had a severe contusion from a blow, passing subsequently through the various phases of coloration. The circles under the lids, extending below the malar bones, often varied in hue, and these changes were frequently very rapid, varying from purple to a deep greenish black. Sometimes the forehead became involved, and the whole face assumed a purplish colour, the conjunctivæ sharing in the suffusion. These changes generally preceded the catamenial epoch, becoming intensified during its occurrence, and disappearing slowly after its close. The case was quite distinct from any I have previously seen. For example, in the instance of a lady who was under my care for some time, several of her female friends thought that the black circles were artificially produced. So black were they that they had the appearance of being produced by Indian ink.

Menstrual Congestion of the Dental Pulp.—Régnier * instances a case of a lady who had a carious tooth plugged with platinum, the pulp being exposed while the cavity was bored out. Every month thereafter, exactly at the time of menstruation, she had severe neuralgia in the affected tooth, lasting for forty-eight hours. The only satisfactory explanation seemed to be that there was a periodical congestion of the pulp, causing it to swell and press against the filling, thus producing neuralgic pain.

Ocular disturbances during menstruation are very common (see remarks on the Ophthalmoscope in Diagnosis).†

Congestive and Obstructive Dysmenorrhœa.

Predisposing Causes of Congestive Dysmenorrhœa. — Plethora; arrested or suppressed menstruation; inflammatory states of the uterus and endometrium; displacements of the uterus; subinvolution; fibroids; polypi.

* *Revue Médico-Chirurgicale des Mal. d. Femmes*, Dec., 1891.

† Ocular neuralgia, exaggeration of refractive disorders, slight attacks of optic neuritis and retinitis, etc.

Symptoms.—Pelvic pain frequently precedes the appearance of the menstrual flow, or continues during the period. It is generally aggravated previous to, and for the first twenty-four hours of, the discharge; the pain may be accompanied by constitutional disturbance. The uterus may be found swollen, tender, and sensitive both to external pressure and internal examination; on a vaginal examination with the speculum we frequently find the characteristic and exaggerated discharge of endometritis blocking up, or hanging from, the os uteri.

Predisposing Causes of Obstructive Dysmenorrhœa in the Ovaries and Fallopian Tubes.—Simple congestion, ovarian apoplexy, acute ovaritis, morbid changes in the corpora lutea, cystic degeneration, cortical and interstitial sclerotic changes, gonorrhœal inflammation, cirrhosis, adhesions, morbid changes in the position or the lumen of the Fallopian tube, due to inflammations, adhesions, strangulation or cystic disease.

In the Uterus.—Mechanical obstruction to the flow of the menstrual discharge, due to stenosis of the cervical canal or os uteri; congenital malformations; uterine displacements which cause a narrowing and bending of the canal, and which favour interstitial effusions into the cellular tissue of the uterus, with resulting hyperplasia and contraction; traumatic—operative measures which result in stenosis; polypi and interstitial fibroids.

Symptoms.—The most prominent symptom is pelvic pain, varying in intensity, often agonizing, preceding and accompanying the menstrual discharge. There may be severe constitutional disturbance, violent headache, and sickness of the stomach. The mind may be weakened by the recurring agony, and delusion may follow, or the patient even become maniacal. Pelvic peritoneal symptoms are frequently present. There are also commonly present considerable ovarian irritation, with pain and sensitiveness of the ovaries; neuralgic pains in the groins; attacks of uterine colic and spasm; hysterical tendencies. Vicarious hæmorrhage may occur elsewhere, as retinal infarctions and effusions, epistaxis, hæmatemesis or hæmoptysis. In some patients the blood becomes depraved, the patient is anæmic or chlorotic; the skin acquires a yellowish-green or discoloured look. It may be that many of these symptoms are in abeyance until the increased sexual activity and local determination and excitement, consequent upon marriage, react on both the ovaries and uterus. Thus frequently we find the first great distress and pain complained of after marriage.

Obstructive and Spasmodic Dysmenorrhœa.

I speak of 'obstructive' as distinct from 'atresic'—*i.e.*, more or less of mechanical obstruction to the menstrual flow due to congenital or acquired contraction, or partial occlusion of the uterine canal. I do not refer to atresia of any part of the genital tract, whether of Fallopian tube, uterus or vagina, or imperforate hymen. The two conditions must always, both for etiological and clinical considerations, be kept distinct. The congestive and obstructive forms of dysmenorrhœa touch each other closely, both from a pathological and clinical point of view. Congestion leads to obstruction. Impediment to free flow tends to congestion. Contraction of the uterine canal is a result common to the congestion that follows a version and flexion, a hyperplastic effusion, a growing fibroid, and an inflammatory state of the endometrium. More of the nature of an obstacle to discharge is the presence of a small polypus. This possible, and indeed probable, cause of dysmenorrhœa is too often overlooked, and the step of dilatation and exploration of the uterus consequently is neglected—a step as beneficial from a therapeutic point of view as it is essential from a diagnostic. Traumatic contraction gives us the same results when it occurs from operative interference or rash therapeutical applications.

These varieties of dysmenorrhœa are, I think, rightly distinguished from that which is the consequence of stenosis associated with congenital malformation of the uterus, as recognized in the characteristic conical cervix and pinhole aperture, or any of its varieties, or the imperfectly developed uterus with short cervix. Yet, as we are classifying a symptom, and not a pathological condition, we must be satisfied to include this frequently occurring misfortune under the heading of 'obstructive.' For my part, I prefer the classification already given (p. 183).

Thus, uterine 'congestive dysmenorrhœa' would include simple congestive conditions and plethoric states; 'uterine obstructive,' such impediments as polypus and fibroid tumours, traumatic contraction; flexions and versions; 'inflammatory dysmenorrhœa'—endometritis and metritis; 'congenital,' dysmenorrhœa resulting from malformations causing atresia or stenosis of the os and cervix; quite apart from these are those circulatory causes found in anæmia, chlorosis, 'toxæmia' and other depraved conditions of the blood.

In the classification I have given, I have not included that form of dysmenorrhœa generally described as '*spasmodic.*'

Every practitioner will, however, meet with cases of dysmenorrhœa in which he can find no satisfactory reason for the pain in any abnormal state either of uterus or ovary. Even if there be a version or flexion, he finds that the uterine canal is pervious; he rectifies the displacement, and still the pain recurs. There may be some congestion of the uterus, and ovarian tenderness, or hypersensitiveness of the internal os on passing the sound, yet not sufficient to explain the violent spasmodic pains that precede or accompany the earlier appearance of the menstrual discharge. We notice occasionally, as characteristic of this form of pain, that the patient states that some clots have passed, and that on the appearance of these the pain has been relieved. The passage of these clots may be followed by a profuse, or rather prolonged, flow. And this brings us to ask :—

1. Is there such a distinct cause of the dysmenorrhœa in uterine spasm as to warrant our regarding this uterine contraction as a special form of painful menstruation, and either pathologically or clinically distinguishable from other forms?

2. Is it correct to assert that the pain has its *source* altogether in the uterine spasm, and not in the mechanical effects of congestive closure, contraction of the canal from flexion, or congenital stenosis?

The truth of the mechanical theory of the pain of dysmenorrhœa was altogether disputed by the late Matthews Duncan. His views may be summarized thus :—

'The most characteristic form of dysmenorrhœa is spasmodic;' it is 'of the nature of a neurosis;' is synonymous with neuralgic, and is 'in its essence' due to 'morbid contractions of the uterus, occurring in connection with menstruation.' These contractions are clonic; they 'come in pangs,' and when the pain is incessant it is because the uterine contraction is tonic. He regarded as analogous conditions the after-pains of pregnancy and spasmodic asthma. He laid down that 'nothing can be more erroneous' than the statement 'that flexion of the passage obstructs the discharge of blood.'

He thought that bad pathology which regards an extreme flexion as the cause of damming up of blood in the body of the uterus, and the usual consequences that follow from such blood accumulation. The fact that a woman has not violent dysmenorrhœa after the first two days of menstruation, as a rule, he considered subversive of the mechanical theory. Its periodicity and the influence of climate on the pain still further, he held, upset the obstruction theory. In short, he ignored the influence of flexion, version, pin-point os uteri, and stenosis, in producing the dysmenorrhœa. If these views were correct,

obviously much of the modern teaching is erroneous, and must be abandoned. I have to confess that I cannot agree with them, for the reason stated in the text.

There is certainly a strong analogy between the pain in uterine obstruction and that which is, in the male, the result of urethral congestion, strictured conditions, and gouty urethritis. In the urethra, as in the cervical canal, it is not necessary that there should be any considerable contraction to produce spasmodic closure. We can pass a large-sized bougie through the urethra of a patient who a minute before could not void a drop of urine. The *pain* is the pain caused by retention of urine rather than by spasm. When we overcome the obstruction (in this case both congestion and spasm) the pain disappears. Various degrees of flexion are doubtless at times to be met with in women who have never suffered from dysmenorrhœa. Take such a case as the following:—

A lady, aged thirty-one, married nine years; had two early abortions shortly after marriage; has continued regular both in quantity and periodicity of discharge since; has never, since she was sixteen, been irregular, nor has she at any time suffered pain. Her husband, a medical man, induced her, for the first time, to submit to an examination to ascertain if there existed any cause for the sterility. She was a highly nervous woman. On examination, I found a rather sharp anteflexion of the uterus, which was evidently of old standing. The uterus was not enlarged, nor was it sensitive. The os was normal. Here the flexion had not caused congestion, nor obstruction, nor apparently any local derangement of the uterine nerves.

In men the irritation of a gouty blood current causes spasmodic closure of the urethra, and produces obstruction. It is periodical, and is relieved by change of diet and hygienic measures. An abormal condition of the tissues and nerves of a sensitive part may cause acute reflected pain elsewhere. Witness severe urethral pain with hæmorrhoids, and remote pains in the extremities from stricture of the uretha. In asthma, instanced by Duncan, the pain or distress is distinctly induced by the impeded blood current, and we have to look altogether beyond the phenomenon of spasm for the primary reason of the obstruction. Doubtless certain uterine contractions are painful, but all are not so, as, for example, those which occur throughout pregnancy, and of which the woman is unconscious. These are purely physiological; they are not pathological, like those of dysmenorrhœa, or, for the matter of that, like the after-pains of labour, in which we often have obstruction, and where there is a foreign body to be expelled. To neither of such contractions can we apply the term 'morbid.'

In those exceptional cases in which we can, on examination, find no abnormal state to explain the dysmenorrhœa, we may feel certain that *it is for the simple reason that we have not been able to discover it.* The subtle relationship of ovary and uterus is sufficient to account for sympathies and reflex acts that we can find no physical explanation of. We must allow that it is the exception to meet with any severe case of 'spasmodic dysmenorrhœa' without some attendant abnormal state of the uterus or ovary to explain it. Malformed cervix, contracted cervical canal, congenitally small uterus (one in which a healthful act of ovulation fails to find its external physiological expression in the proper menstrual flow), endometritis; a flexed hyperplastic and hypertrophied uterus, or one imprisoned by a cellular effusion, and various abnormalities in the size, feel, position, sensitiveness, of one or both ovaries or tubes —all are found associated with the spasm. For these and other reasons, which I do not stay to give here, I believe the term 'spasmodic dysmenorrhœa' to be misleading and unscientific. I still adhere to the opinion I have always expressed to students, that spasm is an accessory symptom in most forms of dysmenorrhœa. That it accompanies the pain is true, but that it is the consequence of the various pathological states above referred to is likewise true. And when we come to ask what light treatment throws on the nature of this affection, I think every therapeutical step we take tends to prove the obstructive theory. The relief afforded by dilatation of the canal by tent or bougie, division of the cervix, the posterior section of Sims, Dudley's operation, galvanism, suitable intrauterine stems, or such medicines as apiol, castor, and various other therapeutic remedies, tends, I maintain, to support the older view that the spasm is a consequence either of some morbid condition in the circulatory current in the uterus, its nerves or tissues, or it is due to a congenital, if not acquired, contraction of the uterine canal.

I believe that in suitable bougies we have the most perfect means of securing safe and rapid dilatation of the uterine canal.

The bougies I have devised possess the advantage over Hegar's, that from their shape and curves they are easier of insertion and manipulation, and the twelve sizes, carefully graduated, meet all the wants of the surgeon.

The time is approaching when for all such cases tents, sea-tangle, and tupelo will be generally discarded for dilatation. Still, there are cases in which the practitioner may not feel himself justified in resorting to the force necessary to dilate a small cervical canal.

Here aseptic laminaria has to be first used, and subsequently the metal or other dilators.

General Treatment of Dysmenorrhœa.—In determining the treatment of any case of dysmenorrhœa, we must be guided by the cause of the pain, and our remedies should be such as are indicated by the constitutional aspects of the case, and any local fault that we may detect. Our first aim should be to correct any constitutional vice, such as general plethora, anæmia, chlorosis, dyspepsia, gout, hysteria, constipation, and those habits which lead up to depraved blood conditions and interfere with the general health. Attention to all those matters already referred to in the instance of amenorrhœa will be necessary—climate, food, clothing, exercise, and abandonment of injurious amusements, occupations, or morbid excitements. Change of air, proper exercise, healthful and regular diet, with attention to the bowels, will cure many a case of dysmenorrhœa without further interference. With anæmic and chlorotic complications, the different chalybeates before referred to, and especially the combination of arsenic, iron, and quinine, must be tried. If we should be suspicious of a gouty diathesis (and 'latent gout' as a source of dysmenorrhœa should always be kept in view), the salts of potassium, lithia, soda, magnesia, are indicated, and these can be given with the bromides of potassium and ammonium, or with colchicum or guaiacum. The preparations 'piperazine' and and 'uricidine' are specially of service. The latter is a most powerful uric acid solvent. The salicylates of quinine, lithia, or soda (effervescing or granular) will be found agreeable and useful preparations. The combination of iodide of potassium, bromide of potassium, and bromide of ammonium, is most valuable. Amongst the English spas, those of Buxton, Bath, Cheltenham, Harrogate, and that of Strathpeffer, in Scotland, are useful, or one of the Continental resorts—Marienbad, Schwalbach, Spa, Kreuznach. The main points to be remembered in advising a spa for dysmenorrhœa is to determine the constitutional vice that may be present, and to select the waters accordingly. Kissingen, Vittel, Plombières, if there be gouty states; Contrexeville and Vichy, if the uric acid and oxalic diathesis be present; Marienbad and Franzenbad for baths in anæmic and hepatic cases, and for special baths, Schwalbach and Spa for anæmia and spanæmia. In atonic conditions of the bowels attended with flatulence, tincture of nux vomica in glycerine, and such carminatives as the compound tincture of chloroform or the spirit of lavender, will frequently relieve. In dyspeptic cases, if

there be gastric acidity, the salts of bismuth in combination with carbonate of soda, papaine and pepsine, lactopeptine, or taka diastase, are indicated.

Aperients.—For constipated bowels we should not hesitate, if laxatives and mild purgatives fail to operate, to advise the occasional resort to an enema.

The pulvis glycyrrhizæ co. of the German Pharmacopœia, in doses of 30 grains to a drachm, may with advantage be given as a mild but effectual laxative in the mornings.

Glycerine enemata and suppositories are a valuable means of relieving the bowels. From ʒss.—ʒi. is administered by means of the proper rectal glycerine syringe. It is convenient to attach a narrow rubber tube to the small syringe, so that the patient can administer the enema lying on her back. I generally order equal parts of water and glycerine, ʒss.—ʒi. of each. In some instances I have had to abandon glycerine enemata on account of the pain they caused. Frequently they produce a burning sensation in the rectum. Oidtmann's purgative is a suppository of soap, glycerine, and rhamnus frangula. Glycerine suppositories can now be had of any chemist, and of any strength desired.

Cascara sagrada palatinoids can be given at night, a dose of Rubinat water being taken the following morning—three-quarters of a wineglass with a tablespoonful of hot water added. The liquid extract of cascara sagrada (liquid extract of cascara, ℥i.; glycerine, ℥i.; water, ℥vi. (℥ss. as a dose)) may be preferred. I commonly prescribe the syrup of figs (Californian) for cases of slight constipation, and find it acts well, and without causing any griping. Sulphovinate of soda is a very valuable aperient for some women (especially during pregnancy). A dessert-spoonful is given with a teaspoonful of syrup of lemon, and half a tumbler of seltzer-water which is added from a syphon.

Of the natural waters, Hunyadi Janos, Æsculap, and Rubinat are the simplest, and, if they act, the best saline aperients we have. They should be taken early in the morning in a little warm water. Generally a small cup of warm tea or coffee, drunk immediately after, will assist the action. A mild alterative or aperient pill can be taken the night before. With many, a tamar confection acts as an aperient. Habit has much to say to constipated bowels, especially in women. We should insist on a daily effort being made to relieve the bowels, and often a drink of cold water, at, or after, breakfast will help. A moist pack, worn over the abdomen

at night, made of a few layers of lint wrung out of tepid water, and covered with an oiled silk pad, I have frequently known assist the action of the bowels. So far as possible, we should avoid drastic purgatives, or encouragement of the constant use of every variety of 'aperient pill.' Brown bread, softer food, fruit, and vegetables, with some simple assistance, as the seeds of psyllium, will generally obviate the necessity for so injurious a custom.

I could instance many cases of most obstinate costiveness in which, for a considerable time, the bowel could only be moved by enemata. In these, dilatation of the sphincters under ether has been followed by permanent cure. The lower bowel is emptied by an enema, and washed out with boric acid solution. The sphincters are then dilated with the hand in the manner before described. After the rectum has been washed out, an enema of salad oil is administered. This is repeated the next morning, and the patient is given nightly a pill of nux vomica, belladonna, and cascara. The dilatation may be assisted by a galvanic current used over the course of the colon daily.* This is well supplemented by abdominal massage.†

Sedatives and Hypnotics.—If the pain be referred particularly to the region of the ovaries, and assume a neuralgic type, the bromides of sodium, potassium, and ammonium are indicated. An excellent combination is that of bromide of potassium (gr. xv.), and hydrate of chloral (gr. xii.), given at intervals of four hours when the pain is felt. An enema of chloral and bromide of potassium will be found of service. Tincture or extract of cannabis indica, tannate of cannabin, humulus lupulus, castor, lupuline, monobromate of camphor, apiol (in capsules), nepenthe or codeine at night, or the subcutaneous injection of morphia, are all of use to subdue the pain. Some of the legion of preparations of the coal-tar series may be tried —antipyrin, antifebrin, 'analgen,' 'antikamnia,' 'ammonol,' all have been used with varied success.‡ Sulphonal and trional are most valuable hypnotics, and in hysterical cases, as a rule, produce sleep. A suppository of trional is an admirable method of administering the drug (each containing fifteen or twenty grains). Chloralamid, in doses of twenty to thirty grains, has many advantages over other hypnotics; it has no after-effects.

* Practitioners will find the 20-cell battery of the Silvertown Company, London, the best. It lasts without any need for renewal for one or two years.

† See chapter on Massage.

‡ The "liquor sedans" in drachm doses is a valuable sedative.

Hysterical and Neuralgic Cases.—Abuse of Morphia Injections.—There is a strong objection to resorting to the subcutaneous injection of morphia in hysterical women if we can possibly avoid doing so. Often a habit and craving is encouraged, with all its pernicious consequences, and the symptoms of morphiomania may be developed.*

The neurotic and lymphatic temperaments have been proved by all observers to be those most susceptible to the toxic effects of the drug. So far as its action on the catamenia is concerned, morphia used habitually has a tendency to arrest menstruation, and sterility is often a consequence, and there are its bad effects on the embryo. One fact of greatest importance stands out clearly in regard to morphiomania, viz., that the 'hysterical' temperament is the one occupying the foremost place in its causation. Hysteria, neurasthenia, neuralgia, cephalalgia, ovarian crises, spinal neuropathies, dysmenorrhœa, neuromimesis, are the correlated conditions, often associated with sexual disturbances, which stand in the forefront of the etiology of morphia abuse in women. And they are, unfortunately, the very conditions for which it is most frequently prescribed.†

* At the British Gynæcological Society, March 14, 1895, I brought the subject of the abuse of morphia in gynæcological practice forward for discussion. I then entered fully into the influence of *temperament* on its action and effects; its physiological and psychical influences; the precautions to be observed in its exhibition.

† Such women are distinctly those that all experience has proved are most likely to be conquered by the physiological action of the drug. They are always importunate for its employment, once they have experienced its effects, and the weak-kneed physician is compelled to yield to their importunity. A prescription is given, possibly a nurse is entrusted with the administration, and very frequently, when the nurse leaves, the patient, retaining the prescription, not only administers, but practically prescribes, the medicament for herself. I have known a supply of two ounces of a morphia solution of the British Pharmacopœia obtained daily at different chemists', and thus as much as eighteen to twenty grains of morphia have been taken subcutaneously within the twenty-four hours. The prescription was copied at different establishments, and no demur was made to compounding it even after the lapse of five years from the date of the original order, nor was the physician who prescribed it made cognizant of the fact that it was so repeated. When, after considerable difficulty, the patient was cured of the habit, menstruation returned, and she conceived, there being an interval of eight years since her last pregnancy. When morphia can thus be readily obtained in large quantities, the tendency often arises for one woman to recommend its use to another, and even to go so far as to subcutaneously inject it into her friends. Thus the habit becomes contagious, and there is even a morbid delight felt in the act of puncturing, not alone herself, but others (Régnier).

Many of the affections of women which specially fall to the lot of the

Paraldehyde* in drachm doses may be given, or urethrane in twenty to thirty grain doses; but though useful as hypnotics, they have

gynæcologist to treat are of a reflex nature, arising out of disorders of the uterus and its appendages, and are to be cured only by the restoration to health of the deranged pelvic organ. In the majority of such cases the morphia syringe is the most mischievous remedy to resort to. It may bridge over a period of time, but often this gain is achieved at the expense of the entire moral control of the woman, and her latent power to endure even trifling pain. I do not quote particulars of cases, but I can say that numerous women whom I have known to be addicted to the morphia habit owed their misfortune to what I could not but regard as the indiscriminate and too careless administration of the drug. In one case a lady of considerable refinement and culture had found her way into a private asylum, an eminent gynæcologist having permitted her to take morphia by the mouth at her own discretion, until at last she arrived at such quantities as would almost seem incredible. On leaving the asylum, where she had been cured, she still continued to fall back occasionally on the use of the morphia; and some years afterwards, when I saw her for a hæmorrhoidal affection, she handed me a small phial containing acetate of morphia in powder, confessing that she occasionally took it in varying quantities and without measurement. For some years she has been completely cured of the habit.

One other point I will only make a passing allusion to, and that is the double-edged nature of this weapon when used by the surgeon after abdominal operations, in masking symptoms of peritonitis, and possible interference with the natural process of cure, through arrest of the secretions. As Greig Smith well says, 'The routine employment of morphia is to be condemned. Complications are better met with a system unimpregnated with morphia.'

Categorically summarizing the different methods of curing the morphio-maniac or morphinises, there are—

'(*a*) Lewistein's method of "abrupt suppression," or sudden stoppage of the morphia; this has been found to be dangerous, and did not answer.

'(*b*) The plan (Erlenmeyer) of gradual suppression, or reducing the doses of morphia by degrees, and extending this over some time.

'(*c*) The medium course of moderate suppression—or stopping the morphia gradually in the course of some eight to ten days. This plan may be combined with the use of various hypnotics. In one case urethane answered well..

'(*d*) Alcohol has been tried as a substitute for the morphia. This has failed.

'(*e*) Chloral also has been tried and abandoned.

'(*f*) Opium itself has been tried, and other of its alkaloids, but they have not answered.

'(*g*) Nitro-glycerine and other drugs have been given.

'The treatment by suppression, combined with judicious control, diet, and the use of hypnotics, is the best plan to adopt. There is danger in deceiving the patient by the substitution of water for morphia, as, once discovered, it is apt to lead to a sense of indignation on her part, and a refusal to be again guided by her physician.

'Subcutaneous injections of atropine have been employed by W. Kochs, of Bonn, as an antidote to morphinism, to diminish unpleasant results of abstinence' (Author).

* The disagreeable taste of the drug may be obviated by giving it in palatinoids: each contains five minims of paraldehyde. Sulphonal may be administered in the same manner.

little effect in relieving pain. Locally, benefit may be derived from the constant current over the inguinal region: 10 to 15 cells of Leclanché's battery may be applied daily. A pigment of iodine with belladonna or a combination of chloroform (ʒ iv.), extract of belladonna (ʒ ii.), tincture of aconite (ʒ iv.), camphor (ʒ ii.), mastich (ʒ iii.), rectified spirit (℥i.), laid on with a brush over both ovaries, is a most effective application, or vesication over the ovary with a little chloroform applied on a watch-glass. But in every case of so-called 'neuralgic' dysmenorrhœa, we must seek farther than the situation of the local manifestation for the cause of the pain. In the intervals between the periods, the closest attention must be paid to the general management of the case; any constitutional defect has to be rectified; tonics should be given, such as quinine, arsenic, bark, minerals, acids, strychnine or nux vomica, the salts of zinc; chalybeates if the patient be anæmic; salines and mineral aperient waters if the tendency be to plethora.

Hysteria.—The *hysterical temperament* has to be met by such remedies as the bromides, in combination with valerian, assafœtida, or galbanum. Much may be achieved by correcting errors of diet, or any abuse of stimulants, by attention to exercise, and by giving the mind healthful occupation with such agreeable outdoor recreation as circumstances will permit.* It is in these cases before all others, unless they be absolutely demanded by some local condition, that we should discountenance vaginal examinations, the use of the speculum, and uterine manipulations. If in the unmarried girl there be a leucorrhœal discharge during the intervals between the periods, in a large proportion of cases it will disappear with appropriate constitutional treatment, aided by the vaginal douche of hydrastis, borax, alum, sulphocarbolate of zinc, carbonate of soda, or permanganate of potash. Should it not do so, or if in the first instance, from the severity of the symptoms or their persistence, we are suspicious of local disease or abnormality, an examination should be made. I repeat that such a step is not to be unnecessarily advised or needlessly persisted in.

The same remark applies to those cases of married women, found floating about in such numbers, who have been to this doctor and that, who flippantly detail all the therapeutic means known for the cure of sterility and dysmenorrhœa, and appear to have exhausted the resources of imagination and art. The womb has been 'slit,' 'cut,' 'stretched,' 'replaced,' 'depleted,' not by one medical adviser,

* See remarks on Weir-Mitchell's 'Rest Cure,' p. 215.

but by two or three; yet they are none the better, but infinitely the worse, mentally and physically, for all this ingenious exercise of manipulative skill.

To restrain a woman from healthful intercourse, with proper intervals of rest, while she is made the victim of exhaustive vaginal explorations and pessary adjustments, is neither just nor reasonable. Erotic tendencies are sustained, and the whims and fancies of hysteria are encouraged.

If there be a plethoric state of the system, a few leeches over the ovaries, or about the anus, shortly before the period, and depletion of the cervix, will be indicated. We can cleanly, quickly, and efficiently deplete the uterus with the uterine lancet. In these plethoric cases we derive benefit from salines, the various saline waters, occasional aperients, and close attention to diet and exercise. Iron has to be carefully avoided. Digitalis, with bromide and iodide of potassium, is a useful combination, or the tincture of strophanthus may in many cases be substituted for that of digitalis with advantage. I have had several combinations made into palatinoids (Oppenheimer) for use in dysmenorrhœa, and have found the preparation 'liquor sedans' admirable for the relief of pain.*

The administration of a pill containing lupuline, ergotine, extract of cannabis (of each gr. i.), taken three times daily, alternating these doses with the bromide of potassium and chloral mixture, is of service. In such obstinate cases we must be particularly careful in the use of stimulants. It is far better to insist on the total relinquishment of all alcoholic drinks. If the patient cannot be induced to abandon stimulants, we had better recommend some light wine, as claret, hock, or sauterne.

The local means of combating dysmenorrhœa will be determined according to the state of the uterus with which, on examination, we find it associated. There may be a version or flexion requiring rectification, and the application of a suitable pessary. The canal of the cervix may be contracted, necessitating dilatation of the canal with uterine bougies. We can in a few days, commencing with the bougie of 11 millimetres, increase to 30 millimetres. If the stenosis be extreme, and the cervix conical, the best course will be to prepare our patient for the division of the cervix, and to perform this operation about ten days after the menstrual period has ceased. After division, the glass or celluloid stem may be worn, or the galvanic stem-pessary can be inserted in cases of congestion

* See pp. 223, 224.

with scanty flow. Inflammatory states of the endometrium, should they be present, must be treated. When any polypus blocks the passage, or a uterine fibroid obstructs the flow, each has to be specially dealt with. The woman's life is rendered miserable by recurrent attacks of pain and intolerable suffering. When all other means have been exhausted without any benefit, we should consider the advisability of removal of the adnexa, placing fairly the exact nature and risks of the operation before our patient.

In those cases in which the pain precedes the menstrual flow, and is characteristically ovarian, with sensitiveness and fulness in the ovary at either side—a fulness which can generally be felt through the vaginal roof or rectum—leeches applied either in the region of the ovaries or near the anus, vesication over the iliac region, warm sitz-baths, full doses of bromide of potassium or ammonium—are among the best means of obtaining relief.

The Weir-Mitchell Treatment.

Splendid results in these pitiable cases of chronic ovarian excitement, with various neurotic troubles—insomnia, loss of appetite, wasting, morbid fancies, and numerous reflex pains—may be obtained from Weir-Mitchell's plan. The principles of his treatment are: 1. Rest and seclusion of the patient. This includes the exclusion of officious, meddling, and over-sympathetic friends; the assistance of an intelligent, refined, firm and judicious nurse and companion. If there be retroversion of the uterus, the patient is kept as much as possible in the prone or face position. This rest treatment must be continued for some weeks. 2. Change of diet. This consists in feeding the patient with a light but nutritious and moderately stimulating diet, much in excess of the demand necessitated by the daily waste—principally milk at repeated intervals; soups; malt preparations (Horlick's malted milk will be found an admirable remedy); a wine, such as burgundy, hock, dry champagne; and other generous diet. 3. The administration of iron. 4. The use of massage * and electricity, a skilled masseuse carrying out the massage for the space of half an hour to an hour once or twice daily. Cocoanut oil is employed to assist the massage. The constant-current battery is used, or a mild Faradic current applied over Ziemssen's points. Lastly, this treatment may be supplemented after a time by the use every morning of a tepid spinal douche,

* See chapter on Massage.

while the patient sits on a stool in a bath-tub with her feet in warm water. The water is poured over the back at a temperature of 80°, and is reduced one degree daily, until it is brought to the ordinary temperature. Suitable friction follows the douche, the patient dressing rapidly and after some food taking a brisk walk, which should not be of sufficient length to exhaust her strength or tire her.

In her work on 'Diet in Sickness and Health,' by Mrs. Ernest Hart, these instructions are given. They are practically those I always follow. In the guidance of a Weir-Mitchell case we must be influenced by the indications present in each individual patient. It is not prudent to hold hard-and-fast rules left to the discretion of a nurse in every case. Temperament, powers of assimilation, capacity to digest milk, and the effects of isolation, have to be regulated for each.

'The patient should be weighed before being put to bed, and at frequent intervals during the treatment. She is first placed on a milk diet, and for the first day or two from three to four ounces are given every two hours. The milk may be slightly warmed, and, if it be particularly distasteful to the patient, it may be flavoured with a little tea or coffee. The quantity of milk taken is gradually increased, and the intervals lengthened to three hours, till at last two quarts are taken in the twenty-four hours. This rest in bed, and the simple milk diet, "nearly always dismiss," says Dr. Weir-Mitchell, "as if by magic, all the dyspeptic conditions" from which the patient had previously suffered. The circulation is at the same time stimulated, and the muscles undergo passive exercise by being kneaded by massage and moved by electric currents. The bowels are carefully regulated. After from four to seven days, a little solid food is taken, namely, bread and butter for breakfast, and a milk pudding for dinner. A day or two later, fish and chicken or a mutton chop are added, first either to the mid-day or evening meal, and then at both. In about ten days the patient is put on three full meals daily, and the diet is as follows:—

'Milk—sixty to eighty ounces.

'Breakfast—porridge and cream.

'Second breakfast—cocoa and egg, bread and butter.

'Luncheon—fish, bread, pudding, and milk, or chicken, vegetables and pudding.

'Dinner—mutton or other digestible meat, two or three kinds of vegetables, milk pudding, or stewed fruit with cream.

'Extract of malt may be given with one or more of the supplies of milk, and in some cases cod-liver oil is also prescribed.'

Membranous Dysmenorrhœa.

This is not a common affection. Here we have exfoliation of the uterine mucous membrane, either in the form of shreds, or sometimes

as a complete cast of the uterine cavity in which are the orifices of the Fallopian tubes or os uteri. Some years since I had a lady, a virgin, under my care who suffered most severely at the menstrual periods, and had always done so. Before marriage, however, she had passed these casts of the uterus, and this continued for the first year after marriage. The little membranous exfoliation preserved completely the form of the uterine cavity. The affection yielded in time to treatment; she became pregnant and had a family. This form of dysmenorrhœa is not necessarily related to conception. It does not of necessity cause sterility, though as long as the affection persists it predisposes to this condition. Microscopically, the membranous layer is found to be composed of connective-tissue, glands, and deciduous cells.

In two cases reported by Mansell-Moullin, the structure of the membrane was shown to consist of 'large fusiform and rounded cells, many of which appeared to have two nuclei, as if undergoing proliferation, containing utricular glands lined with columnar epithelium of large size, and numerous blood-vessels of different calibre.' The passage of the membrane is not always accompanied by pain. There is frequently associated with the dysmenorrhœa a degree of chronic inflammation of the uterus. We must not confound this membranous cast with an exfoliation or a blood-coagulum. The microscope and a little care will prevent this error. Hitherto neither the abortive evolution theory, nor any other, has satisfactorily explained the causation of this affection. If we hope to alter the character of the menstrual act radically, we must change the nature of the uterine mucous membrane. The most energetic treatment consists of dilatation of the uterus, the use of the curette, and the subsequent application of chromic acid to the endometrium. Inflammatory complications are subdued if they exist. The interior of the uterus should be treated during the intervals between the periods by such remedies as fused nitrate of silver or sulphate of zinc points, iodized phenol, ichthyol, or carbolic acid. If the pain be severe during the separation of the membrane, chloral and bromides, opiate suppositories, vaginal pessaries of belladonna and morphia, morphia injected subcutaneously, will give relief. It is better, while the patient is under treatment, to forbid coitus.

Electrolysis in Dysmenorrhœa.—Dilatation by electrolysis has answered well in several reported cases. The positive sponge rheophore is placed over the abdomen, and the negative electrode

is introduced into the uterus through the internal os. The sitting lasts from ten to twenty minutes. Six small Leclanché cells are used:*

General Therapeutics.—I have before referred to the remedies *aletris*, *pulsatilla*, *viburnum*, *apiol*, *castor*, *oxide of manganese*, and *liquor sedans*. I have given with great benefit antipyrine, phenacetine, and antifebrine, and the patent combinations antikamnia and ammonol, in those cases of an undoubtedly neuralgic type; especially have they proved of service when there have been associated neuralgic pains in the sides, groin, and legs. The doses I have given of them have been from 5–7 grains, repeated every few hours.

In rheumatic dysmenorrhœa *salophene*, *salicylate of soda*, or *salol* in combination with *guaiacum* may be tried.

Oxalate of cerium has been recommended by Chambers. He gives it in six-grain doses to healthy women who suffer before the period and during its onset. Here the palatinoid form is convenient.

* See remarks on Electro-Therapeutics.

CHAPTER IX.

DISORDERS OF MENSTRUATION (continued)— MENORRHAGIA AND METRORRHAGIA.

HÆMORRHAGE.—I have already given a brief classification of hæmorrhage, whether as a simple exaggerated menstrual flow, or that which occurs independently of menstruation, due either to disease in some other organ than the uterus, or having a strictly local origin. In dealing with any case of uterine hæmorrhage some broad practical rules have to be remembered. I should say in their relative order of importance they are as follows :—

1. Never neglect or trifle with, by simple palliative measures, an unusual, continuous, or exaggerated loss of blood from the uterus.
2. Always remember that the hæmorrhage is but the sign of some abnormal condition elsewhere, or of disease in the uterus itself.
3. *In case of doubt make a careful vaginal examination; should this not explain the cause, and the hæmorrhage continue, dilate the uterus and explore its cavity.*
4. Once the cervix is dilated, maintain a certain degree of dilatation, as long as the discharge of blood should continue.

The local conditions most frequently met with which cause hæmorrhage are: Fibroid tumours, subinvolution, endometritis and cervicitis, morbid conditions of the endometrium, products of conception in utero, erosion of the external os and cervix, granular states, malignant disease, polypus, and uterine congestion associated with flexion, and ovarian congestion.

Our treatment of hæmorrhage may be divided under two heads: (1) Attention to any organic disease in the heart, lungs, liver, spleen, kidney; the control of excessive discharge during the exanthemata, in purpuric states, at the climacteric period, or after prolonged lactation. (2) The removal of the local cause by operation or other local treatment.

It is not my intention in this place to enter into the different means of checking hæmorrhage, as this is necessarily done when detailing the treatment of the various morbid conditions that give rise to it. But it may be well to tabulate the most useful and efficacious hæmostatics and astringents we possess :—

1. *Heat.*—By the vaginal douche and water at 115° to 120.°

The can (Fig. 183), filled with water at the required temperature, is hung on a nail or a hook of a bed-curtain ring (or placed on the top of a wardrobe) about 8 feet high. The patient (in the horizontal position, if possible) inserts the tube, directing it backwards into the vagina, and by turning the cock the water flows. The can ought to be larger than those usually sold, and should contain 2 quarts. It is preferable to have the assistance of an attendant or nurse. Tincture of iodine, Kreuznach liquor, Woodhall Spa water, boric acid, bicarbonate of soda, borax, Condy's fluid, liquid extract of hydrastis, may be added to the water.

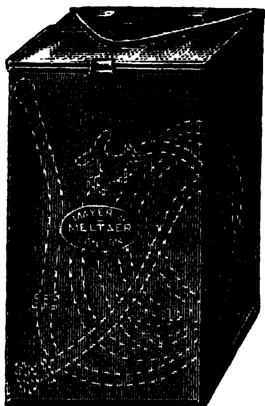


FIG. 183. — USEFUL AND PORTABLE CAN DOUCHE IN WHICH THE TUBE AND PIPE ARE PACKED FOR TRAVELLING.†

I think the admonition of W. Goodell, with regard to the hot douche, contained in his paper on 'What I have Learned to Unlearn,' of the greatest importance, and it is one in which I fully concur.*

'My experience teaches me that, save in some cases of active congestion or of acute inflammation of the pelvic organs, the hot douche is of questionable utility, and that its indiscriminate employment has done far more harm than good, especially when continued for any length of time. I cannot withhold the opinion that from its use ovaritis, salpingitis, and peri-uterine inflammation have actually been set up by the over-heating and the subsequent chilling of the pelvic organs. The crucial test of surgical research, which cannot be gainsaid, has shown that cellulitis is almost a myth, and that what have been deemed exudation tumours and inflammatory deposits in the areolar tissue, are tubal and ovarian lesions.'

There can be no doubt that the use of the hot douche degenerated into an abuse, and that mischievous effects were frequently caused by a remedy which was ordered indiscriminately for every form of pelvic disease that manifested itself by a hæmorrhagic discharge.

* *Provincial Medical Journal*, vol. x., p. 243.

† See p. 111 for douche with temperature and water gauge.

.2. *Cold.*—Vaginal douche; ice-bag in vagina; irrigating tube in vagina; ice-bag or bladder over pubes. Cold is always to be used with caution where there is great debility or tendency to collapse. Leiter's tubes may also be placed over the uterus.

3. *Tampon.*—This may be applied in the form of a sponge-tent inserted into the cervix—the sponge acts both as a dilator and plug.

Vaginal Tampon or Plug.

In cases of hæmorrhage we can make a convenient and efficient plug thus: A roll of aseptic wool is tied in the centre with a string, and spread out umbrella-shape; several small pieces of wool are at hand. Moisten the surface of the wool with a little perchloride or the subsulphate of iron solution, extract of hamamelis or hydrastis, glycerine and carbolic acid, glycerine of tannin, or glycerine and permanganate of potash solution. A Sims' speculum is introduced. The medicated wool with the string attached is now pressed home against the os—it is better to first dry the part thoroughly—and following it the smaller pieces of wool are pushed in, until the upper part of the vagina is well filled. I always remove such a plug after twelve hours. If we want more securely the vagina to fill, we may use strips of lint, chinosol, or iodoform, in the form of a 'kite's tail.' The lint may be moistened with carbolized water, perchloride of mercury (1 in 10,000), or permanganate of potash solution.

The strings attached to the rolls should be numerically knotted as they are inserted, so as to distinguish them in removal.

If the object be to first fill the space of Douglas, the better plan is to place the woman in the knee-elbow position and fill the posterior cul-de-sac with several small tampons, moistened with a disinfectant.

Two rules are to be always borne in mind in regard to plugging; (*a*) Never look upon plugging save as a temporary expedient for the control of hæmorrhage; (*b*) never permit a plug to remain for a longer period than twenty-four hours at the outside in the vaginal cavity, and always disinfect and cleanse the vagina after its removal and before a second is inserted.

4. *Local Astringents:* alum, in tampon or injection; persalts of iron, perchloride of iron, either as the liquor, or, what is far preferable, the solution in water of the solid salt, made any strength (grs. xxx. ad ℥i.); sulphate of iron solution (℥ss. ad ℥i., Sims); ferro-alumen; gallic acid; tannic acid; matico in injection; hamamelis. The interior of the uterus may be thoroughly wiped with any of these agents. Vaginal tampons of glycerine, and liquid extract of hydrastis with tincture of matico, are very efficacious.

5. The more powerful *therapeutic remedies* are ergot; ergotine, or sclerotic acid, given subcutaneously; ergotine, with lupuline and

quinine, given in pill; tincture of perchloride of iron: infusion of matico, alone or in combination with perchloride of iron, gallic acid, tincture of digitalis, or extract of hamamelis; digitalis, in combination with ergotine, dried sulphate of iron and quinine; gallic acid (gr. xx. doses), with infusion of matico and liquid extract of ergot, or the ammoniated solution of ergot; ergole; quinine, with aromatic sulphuric acid or dilute sulphuric acid, aletris, viburnum, hydrastis.

The clinical indications for the employment of hydrastis are to be found especially in those various atonic vascular states of the uterus, occurring at any period of active menstrual life, some of which are attended by excessive loss of blood, either of the menorrhagic or metrorrhagic type. Also it is of benefit in those cases of congestive dysmenorrhœa in which we find frequently the severest degree of menstrual pain, though the loss of blood is excessive. My experience quite confirms that of Goth,* that it is especially in hæmorrhages of the menopause, provided there be no organic changes in the uterine tissues, nor intra-uterine growths present, that the value of hydrastis is best seen. I speak more particularly of its internal use. I combine with the hydrastis such remedies as ergot, or ergotine, sclerotic acid, cannabin, digitalis. It is with a view to the administration of these drugs in a convenient form that I have had palatinoids prepared. Hydrastia and sclerotic acid will be found most useful in vicarious hæmoptysis or epistaxis (in the latter the extract may be used with glycerine and tincture of matico most efficaciously as a local styptic, or on a tampon). In chronic hyperplastic conditions, in the earlier stages of uterine subinvolution, in the 'secondary hæmorrhages' (McClintock) that follow abortion, miscarriage, or labour, hydrastis in combination with other astringents will be found valuable, both administered internally and applied locally. I have many times tried both the tincture, extract, and alkaloid in various forms of myomata. The results have been generally disappointing. There have been some modification and partial control of the bleeding occasionally, but no permanent or marked relief.

Stypticine as a Uterine Hæmostatic.—I have lately used stypticine with hydrastia, Gottschalk's experiments having shown the value of this alkaloid in the treatment of uterine hæmorrhage. It is one of the oxidation products of narcotine. The dose of stypticine is 0·05 gramme, four or five times in the day. It combines a

* *Lancet*, Feb. 1887.

sedative with its styptic action. Gottschalk uses it as an adjuvant to the curette. It must be remembered that it is an excitor of uterine action, and hence is contra-indicated in threatened abortion. It is a powerful vaso-constrictor. The hæmorrhages in which it proves of most service are those due to uterine interstitial fibroid, and in menorrhagia due to subinvolution.*

Vascular Tonics and Hæmostatics.—In those cases of atonic dyspepsia and general debility, so commonly met with in women who have suffered from menorrhagia from any cause, especially those who have lived in the tropics, the tincture of hydrastis will be a valuable adjunct to other remedies, particularly if there be cardiac weakness accompanying the dyspeptic state or loss of appetite. In such cases, in union with *the vascular tonics, digitalis, convallaria, and strophanthus*, the tincture of hydrastis, if there be deficient cardiac systole and rhythmic irregularity, is a very good combination. In my earliest contribution to periodical literature, I urged the therapeutic value of digitalis in uterine hæmorrhage as indicated by its physiological action. It is especially in such cases as those just alluded to, in which we find ventricular incompetence, that this drug acts well with hydrastis when the system is generally enfeebled by repeated, erratic, and excessive loss of blood. The value of strophanthus in dysmenorrhœa has been pointed out by different gynæcological authorities, and its use in cardiac incompetence is established. The uterine hæmorrhage which is associated with aortic disease is most troublesome to treat. Here strophanthus is specially indicated. It has the disadvantage, as compared with digitalis, that we are not so certain of its action in causing contraction of the arterioles, and its effects are not of so permanent a nature. But in those cases of menorrhagia and metrorrhagia associated with cardiac, functional, or organic lesions, occasionally attended by dysmenorrhœa, the administration of hydrastis and strophanthus will be found of great service, and there is no objection to the addition of ergot. Strophanthus in such cases has this advantage over digitalis, that it is better tolerated when administered for any length of time. Hydrastis is a valuable adjunct to the uterine tonics, aletris farinosa,

* I have had it combined in the palatinoid form with ergotin, hydrastia, and cannabin tannate. Thus—

Hydrastia, gr. ½.
Ergotin, gr. ¾.
Cannabin tannati, gr. ½.
Stypticin, gr. ¼. M.

and 'celerina,' and I have frequently given these drugs together with great benefit.* The same may be said of the combination known as 'aletris cordial.' In passing, I may bear testimony to the great benefit I have frequently seen follow the use of both these remedies in uterine affections, the combination 'celerina' (celery, coca, kola, viburnum, grs. v.—ʒi.) being a capital tonic for women who have suffered from uterine losses. The local use of hydrastis in uterine affections is as important as its internal administration. The fluid extract is the preparation most suitable for topical use. I have for several years used it in common with other applications, added it to these, in cases of chronic endometritis, in cervical (bleeding) erosions, and after scarification of the cervix for congestive states of the uterine cervix. I usually combine it with ichthyol solution (20 per cent.), carbolic acid or iodine, adding equal parts of glycerine.

As a cervical dressing it will be found of service applied on the vaginal tampon, either alone or with one of the above-named additions. The tampon, first soaked in glycerine and shaped, has a little hydrastis extract, or the compound preparation, poured on the surface, and is easily applied at night by the patient herself. A patient should be taught how to properly apply a tampon. In many instances it might as well be left on the toilet-table. In cases where the use of the hot douche (110° to 120°) is called for, the liquid extract of hydrastis (ʒii.—ʒiv.) may with benefit be added to the water contained in the quart can. These local applications of hydrastis or its alkaloid are most necessary additions to the internal administration of the drug.

The general management of the patient suffering from menorrhagia will depend on the constitutional state on which the hæmorrhage is attendant. General or ovarian excitement may be controlled by bromides. In atonic states, strychnine, in combination with quinine and iron, is indicated. If the debility induce hysteria,

* These will be found useful combinations—

℞. Ext. viburni, gr. ii.
Ext. aletri, gr. ss.
Coalophylin, gr. ¼. M.
Ft. palatinoid.

℞. Ex. viburni, gr. ii.
Ext. hydrastis, gr. ii.
Ext. piscidiæ erythinæ, gr. i. M.
Ft. palatinoid.

Both these forms have been made for me in palatinoids by Messrs. Oppenheimer.

valerian (ammoniated tincture and infusion) is an admirable addition to the bromide preparations. In plethoric conditions, at the time of the menopause, and if there be any hepatic congestion, saline purgatives, bitter waters, vegetable cholagogues (podophyllin, iridin, euonymin), alternated occasionally with a mild mercurial, as a few grains of calomel or grey powder, should be given. If loss of blood should have induced an anæmic or chlorotic state, iron should be judiciously administered in any of the forms already mentioned, the dialyzed preparation of Squire, Fellows', Easton's, or Dusart's syrups, Flitwick iron water, Blaud's pills, the perchloride tincture, and the chloroxide, being excellent forms to administer it in.* Hæmoglobin in the troches of Pfeuffer (Munich) is a capital remedy. These troches I have had made in the form of syrup to avoid the unpleasant taste of the drug.

* For reference to the treatment of menorraghia by electricity, see remarks on Gynæcological Electro-Therapeutics.

CHAPTER X.

UTERINE DISPLACEMENTS.

PRINCIPAL PREDISPOSING CAUSES OF UTERINE DISPLACEMENTS.

GENERAL debility, inducing relaxation of uterine supports.
Pregnancy and labour—ruptured perinæum—laceration of cervix.
Pelvic adhesions following peritonitus and pelvic inflammation.
Pelvic effusions.
Vaginal prolapse.
Violent muscular efforts.
Congested states of the uterus.
Distension of rectum or bladder.
Fibroid tumours of uterus.
Abdominal tumours—collections of fluid.
Areolar hyperplasia.
Imprudent habits of dress—tight-lacing—too tight binding after labour.
Sedentary occupations.
Traumatic causes—falls, jumping from heights, etc.

IMPORTANT DISPLACEMENTS.

Anteversion and anteflexion.
Retroversion and retroflexion.
Prolapse.
Ascent.
Inversion.

SOME RESULTS, DIRECT AND INDIRECT, OF UTERINE VERSIONS AND FLEXIONS.

Amenorrhœa.
Dysmenorrhœa.
Menorrhagia and Metrorrhagia.
Uterine congestion.

Uterine hyperplasia.
Uterine fibroids.
Stenosis and sterility.
Dyspareunia (painful coitus).
Uterine prolapse and vaginal inversion.
Vesical irritation—incontinence—retention.
Rectal irritation—constipation—hæmorrhoids.
Rectocele.
Perimetritis.
Pelvic phlegmon.
Hæmatocele.
Difficulty in locomotion.
Sacral and lumbar pain—neuralgia.
Abortion.
Ovarian congestion—ovaritis—salpingitis.
Displacement and distortion of the Fallopian tube.
Ocular derangements.
Various reflex pains and neuroses.

Anteversion.

The uterus in the normal condition lies slightly anteverted in the pelvic cavity (Fig. 184). Owing to pressure from above, or posteriorly, or from the yielding of its supports, above, below, or at the side, or from contractions or adhesions which drag on it anteriorily, the fundus uteri is thrown further forwards in the pelvis. Ultimately it is so far displaced from its proper relation to the pelvic brim that it rests against the bladder, while the os uteri is carried back towards the pouch of Douglas. As we might suspect, from the normal inclination of the uterus, and the influences which operate in producing the first exaggeration of it, we find this a common uterine displacement. In its worst form it is most distressing to the patient, and most difficult to relieve.

Any of the affections I have just grouped as consequences of displacements may result from extreme anteversion. Those that are found as the most frequent attendants on it are—amenorrhœa and dysmenorrhœa, uterine congestion, uterine fibroid, stenosis, sterility, vesical and rectal distress, uterine prolapse, locomotor symptoms, sacral and lumbar pains, ovarian congestion, and ovaritis. *It is a safe maxim in gynæcological practice to look outside the bladder itself for the cause in any case where there is difficulty before or during*

the act of micturition, or evidence of retention of urine. We shall very frequently find it in an anteflexed or retroverted uterus. In like manner, when there is tenesmus, or a sense of pressure in the rectum and general rectal distress, with the passage of fæces which are in form suggestive of stricture, we may discover the cause in uterine displacement.

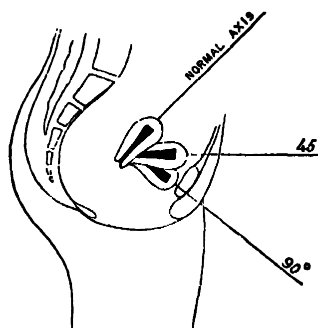


Fig. 184.—Degrees of Anteversion.

Diagnosis.—If we suspect the malposition, there is no difficulty in quickly verifying our suspicions. *We might, if careless, confound both anteversion and anteflexion with a fibroid of the uterus, or a vesical tumour.* We are liable to overlook the pathological condition attendant upon or preceding the version—as, for example, an *intramural fibroid, subinvolution of the uterus, simple hypertrophy, an intra-uterine polypus, adhesions, metritis or perimetritis.* While we may therefore prove satisfactorily that the uterus is anteverted or anteflexed, we must, by a searching digital and bimanual examination in the manner previously described, and with the sound if necessary, exclude any possibility of such complications being present. By digital examination, the absence of the cervix from the fornix of the vagina, its position posteriorily in the sacral hollow, and the detection anteriorly of the hard fundus, less so in the dorsal decubitus, will show that the uterus is anteverted. By abdomino-vaginal examination we can get the entire organ between our hands, and satisfy ourselves that this mass which is felt anteriorly is the fundus uteri. If there should be still a doubt or suspicion of other complications, it may be necessary to complete the diagnosis with the sound. I repeat here the obstetric axiom—*Do not take the uterine sound in hand in any case in which there is a suspicion of pregnancy.* Most necessary is it to recollect this rule in the instance of an enlarged and anteverted uterus. Should the possibility of pregnancy be excluded, more especially if we desire to use the sound both for a diagnostic and therapeutic purpose, we may pass it. This, at times, is not such an easy operation. It may be difficult, even when the sound is well curved, to get it into the os uteri in extreme anteversion. Some old flexion may impede

its progress; so may also a uterine growth. The important lesson we must learn is, to use no force in the attempt. By carrying the handle well back, or by giving the instrument various degrees of curvature, we shall succeed by gentleness, and not by force.

Treatment.—Having determined the degree of mobility of the uterus, we can, with the fingers of the right hand carried deeply behind the pubes, press the fundus upwards and backwards, while, at the same time, we steady the cervix with a finger of the left hand in the vagina, and draw it forwards. Should the uterus be so fixed that we cannot succeed in this manœuvre by the fingers, it is seldom that we can safely effect much greater permanent improvement in position by the sound. Recollecting the etiology of anteversion, it is obvious that the mere reposition of the uterus is frequently the least part of the practitioner's duty. The general health of the woman must be carefully attended to, and her secretions regulated; congested and hypertrophic conditions of the uterus, contractions of the cervical canal, any complicating tumour or effusion, ought, as far as possible, to be rectified, and any abdominal pressure relieved. In the meantime, we endeavour to raise the fundus uteri, and retain it in position by a pessary.

It must be clearly understood that all these remarks refer to an extreme degree of this form of uterine displacement.

As Matthews Duncan well remarks: 'When everyday experience teaches us that every kind of pessary, *in cases of anteversion or retroflexion*, frequently fails to give relief, and often only creates distress, we shall hesitate before we place in the vagina for this variety of uterine displacement a pessary of any kind.'

I have on several occasions taken out a pessary without the patient being aware that I had done so until her next visit to me.

I have already instanced an extreme case of anteversion causing such incontinence of urine as to need the use of a urinal, which was cured by suspension of the uterus. In any serious case I should not hesitate to adopt this treatment, at the same time enucleating any small intramural fibroids if such existed. This operation I have just done in the instance of a young lady who consulted me for frequent micturation, passing water every hour, and this trouble had existed for some time. She retained, with comfort, for six hours immediately after the operation.

On the Use of Pessaries generally.—I take the opportunity of quoting Matthews Duncan's advice: 'Think twice before beginning the often baneful practice of using any instrument, teaching a woman to depend on what, if not positively useful, is positively injurious, though perhaps not much. Many a woman has suffered from, and many a woman has died of, a pessary; but

most pessaries, as I find them, are nearly innocuous for evil or for good. Writing as far back as 1876, Gaillard Thomas, referring to the general use of pessaries, says: 'Were I asked at the present moment whether I believed that in the aggregate they accomplished more good or evil, I should be forced to give a doubtful reply.' He goes on to attribute the injurious consequences not so much to the instruments themselves as to their mode of application.

I would add that the opinion here quoted, applies especially to cases of anteversion and anteflexion rather than to retroversion and retroflexion. I do not believe that any woman who suffers from marked retroversion of the womb can be a healthy woman. And, further, I think it is our duty, as gynæcologists, to use every available and justifiable means to relieve her of an affection which, in the great majority of cases, is curable.

Goodell, in the paper before quoted, says:—

'I have learned to unlearn that anteflexion and anteversion in themselves —that is to say, as displacements merely, and without narrowing of the uterine canal—are necessarily pathological conditions of the womb. The mistake made, as I have more elaborately shown in my "Lessons in Gynæcology," is in attributing to this natural position of the womb the various forms of pelvic trouble, especially that of irritability of the bladder, to which women are so liable. But the sympathy between the brain and the bladder is a remarkably close one—so close, indeed, that some physiologists contend that "every mental act is accompanied by a contraction of the bladder." A nervous bladder is, then, one of the earliest phenomena of a nervous brain, for nervousness means a deficient control of the higher nerve-centres above the lower ones—a lack of brain control. Now, a hysterical girl, or a woman whose nervous system has given way under the strain of domestic cares, consults the physician for such ordinary symptoms of nerve-exhaustion as wakefulness, utter weariness, a bearing-down feeling, backache, and perhaps, above all, an irritable bladder. Upon making a digital examination, he usually finds the fundus of the womb resting on the bladder, where it naturally should rest. At once he jumps to the conclusion that the whole trouble is due to pressure of the womb on the bladder—viz., to the existing natural anteversion, or to the anteflexion, as the case may be. Enticed away by the vesical lapwing from the bottom factor—the shattered nerves—he now makes local applications, and racks his brains to adapt or devise some pessary capable of overcoming the supposed difficulty, heedless of the dilemma that the upward, or shoring, pressure of the pessary on the bladder must be greater than the counter, or downward, pressure of the womb, to which he attributes the vesical irritability.'

Having thus briefly expressed my belief that the rash or indiscriminate use of pessaries is to be strongly condemned, I desire, on the other hand, not to be understood as undervaluing the assistance in treatment we obtain through the well-adjusted pessary.

'Notwithstanding all this,' said Marion Sims, 'I advocate and daily use pessaries in one form or other; because, if I did not, I should turn away a multitude of cases without doing anything at all for their relief. We should always do without them if possible; but if it be impossible, then it is the part of wisdom to resort to such appliances as will best answer the indications of the individual case.'* In all forms of displacement where its employment is clearly indicated, it generally gives material relief. I know few steps in gynæcological therapeutics attended with such obvious and immediate benefit and comfort to a patient, as the restoration of a retroverted uterus to its normal position, and its support and retention by a well-fitting pessary. In the same manner, in varying degrees of descent of the uterus, which more or less accompany all versions and flexions, with a pessary suited to the case we immediately secure that sense of support, and prevent the bearing-down feeling and associated pain which are so distressing. By replacement of the uterus, the use of a pessary, and the adoption of the postural plan and periodical reposition in the knee-elbow position, in cases of retroversion the uterus and its supports can be restored to a healthy state, so as in time to obviate the necessity for any mechanical appliance. In graver degrees of displacement a mechanical support is, as a rule, a tedious and frequently disappointing mode of treatment, and ventro-fixation, vaginal fixation, or shortening of the round ligaments, is the quickest way to restore the woman to health and comfort.

I shall only here refer to the few pessaries I believe to be of any service in anteversion.

There are some safe rules to observe in regard to the use of pessaries in general practice:—

1. Always make a careful digital exploration of the vagina and uterus before their application (the rectum and bladder being empty).

2. In anteversion and anteflexion, if there be uterine congestion, sensitiveness, or enlargement, avoid the use of a pessary until such conditions are relieved.

3. Replace the uterus before introducing any pessary.

4. *Whenever possible, mould and fashion, from a celluloid ring, pliable metal, or the soft rubber and wire Hodge, the pessary you require, and regulate its size and shape, or lever-power, according to the degree of version or flexion, the tightness of the vaginal roof, and the capacity and muscular tone of the vagina.*

* 'Uterine Surgery,' by Marion Sims, p. 264.

5. Always teach the patient how to remove a pessary, should any pain or discomfort arise from its use. In many instances it is equally easy to teach her how to reinsert it; but, as a rule, this should be done by the practitioner.

6. Let the patient be seen occasionally at first, so as to ensure comfort in the use of the appliance, to detect any accidental displacement, and to watch for any vaginal irritation. Patients wearing pessaries should be kept under observation, and periodical cleansing of the vagina with a disinfecting solution prescribed. Strict attention must be paid to the bladder and rectum. (It is well in anteversion to encourage the patient to retain the urine). In the case of a married woman endeavour always to select a pessary that does not interfere with coitus.

I do not believe that any verbal description can teach the proper selection or the correct adjustment of a pessary. This must be



FIG. 185.—GALABIN'S PESSARY.

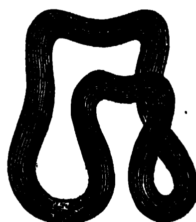


FIG. 186.—BLACKBEE'S PESSARY.

learned in the hospital ward, in private practice, or in the extern obstetric department of a hospital. In anteversion our object is to raise the fundus, and place such a support anteriorly as will prevent it relapsing into its old position. In many cases of anteversion sufficient support for the uterus can be obtained from a Hodge, moulded to suit the case.* Celluloid rings of different sizes can be readily converted, by dipping them into very hot water, into any variety of lever support. We can rapidly shape from such rings a Hodge, with the arms of the lever of any length or form we wish. When the ring has been so moulded, it is dipped for a few seconds in cold water to set. With these rings we are enabled to adapt, for the case before us at the time, a pessary of any size or shape we think applicable. Galabin's pessary, I believe, is the most generally useful one in anteversion. It is made of

* Many celluloid rings are useless, they are so soft and weak. Arnold and Son have the best celluloid rings I know of, especially those with a central wire (p. 250).

vulcanite (Fig. 185). The anterior limb of Hodge 'is replaced by a broad arch directed upwards, and nearly square at the summit.' 'In introducing the instrument, it is at first passed entirely within the vulva, with the upper limb in front of the cervix; the index-finger is then carried through it, and hooks the upper limb back over the cervix and into the posterior cul-de-sac.' In using this support, it is essential to see that it fits comfortably, and is neither too tight nor too loose in the vaginal canal.

Fig. 187 shows Grailly Hewitt's cradle-pessary, and its relation to the uterus when applied. We introduce it by pushing in the large ring of the pessary through the vulva, pressing it steadily in an oblique manner upwards and backwards; the summit of the instrument is then carried into position in front of the uterus, its lower end being pushed gently upwards.

The rubber pessary of Blackbee (Fig. 186) will be found easy of application. It can be adapted both for anteversion and retroversion.

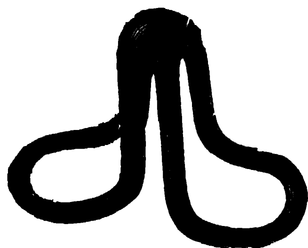


FIG. 187.—HEWITT'S PESSARY.

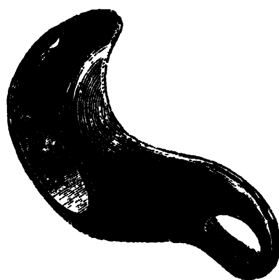


FIG. 188.—FOWLER'S PESSARY.

I have given complete relief after reposition, by the employment of a Fowler's pessary of the proper size. Though this pessary is more applicable for retroversion, and personally I rarely employ it for anteversion, still, it will be found, in both forms of displacement, a safe, easily applied, and useful pessary by the general practitioner (Fig. 188).*

A Fowler's pessary of such a size should be chosen as will not incommode the cervix or the vagina.

* A caution is necessary in regard to this and any hollow vulcanite pessary. Should any small crack or opening be made in the instrument, it becomes foul and imprisons decomposing secretions. The principle of this pessary can generally be easily shown to the patient, and she may be taught how to remove and replace it. This is not possible with some women, and it should then be periodically removed by the surgeon and examined. The pessary as made by Messrs. Arnold is not open to this objection.

When the pessary is in position, the neck of the uterus is received into the cup of the support, *and the curved anterior portion, with the small opening for the finger to facilitate introduction and removal, lies in front of the uterus.*

ANTEFLEXION.

Anteflexion may be either congenital or acquired. The body of the uterus is bent forwards over the cervix, and the axis of the cavity of the fundus uteri no longer forms a continuous and slightly curved canal with that of the cervix, but is placed at an angle, varying in degree according to the extent of the flexion. The cervix may be directed forwards at various angles, while the cavity of the fundus retains its normal axis; or the flexion may occur both in the body and neck of the uterus, an extreme degree of angular constriction at the isthmus uteri resulting.

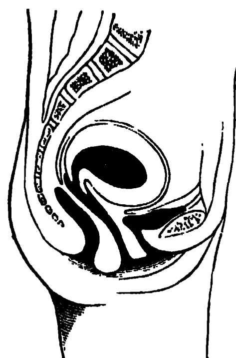


FIG. 189.—ANTEFLEXION OF UTERUS. (Schroeder.)

The lesions anteversion and anteflexion blend into one another. There has been a state of anteversion prior to the flexion. In primary anteflexion this displacement may not give much trouble until after marriage, when the increased stimulus to menstruation excites a more profuse menstrual discharge, and the obstruction to its flow caused by the flexion produces dysmenorrhœa. On the other hand, it may be accidentally discovered, and should always be remembered as a likely cause of severe dysmenorrhœa occurring with the earlier periods in young girls.

Gaillard Thomas described cervical and cervico-corporeal flexions as those most frequently met with in nulliparous women, while the corporeal displacement is that seen in multipara. My experience would lead me to say that in practice we meet much more frequently with the corporeal than the cervical flexion. It is in cases of primary or congenital anteflexion that we find other abnormal uterine developments—short or conical cervix, short anterior lip, small uterine opening.

Causation.—An acquired anteflexion may be induced and promoted by almost any of the influences mentioned as tending to produce anteversion. I have already referred to the importance of a free

circulation at the 'axis of suspension' (Barnes) of the uterus. Any obstruction here must lead to venous congestion, congestion to interstitial hardening, or hypertrophy, and, as a result, either morbid growths or secondary contractions are formed. In no situation should we more naturally expect these to occur than in the anterior wall of the uterine fundus. Increase of size demands larger arterial blood-supply, and, consequently, we have not alone greater habitual venous congestion, but the periodical determination of blood at the menstrual period adds to the general uterine derangement. Any further obstruction to the free flow of blood still more increases the evil. The cycle of changes may commence either in morbid processes promoting congestion and weight in the uterine wall, or in an interruption to the circulation at the 'axis of suspension,' with consequent alteration of tissue at this part. These conditions may be secondary to pathological extra-uterine states, such as tumours, adhesions, inflammatory effusions, a retro-hæmatocele, pressure from the rectum posteriorly, or from the abdominal viscera above. Or this initiatory mischief may be associated with ovarian congestion, inflammatory effusion in the broad ligaments, contraction and thickening of the Fallopian tubes, and occasional perimetric attacks.

Symptoms.—The symptoms depend to a great extent on the degree of flexion, the size of the body of the uterus, the accompanying stenosis, the pressure on the bladder; or such complications as metritis, endometritis, and perimetritis. The hypertrophied fundus with its enlarged vessels, or possibly a small anterior mural fibroid, explains the menorrhagia frequently seen in these cases. Sterility being a common consequence of anteflexion, it is frequently present, with many of its attendant ills. In addition to the dysmenorrhœa, there is occasionally dyspareunia, an irritable and sensitive vulvar orifice and vagina, a sensitive and congested cervix, with pain on pressure in the posterior fornix of the vagina, caused by the swollen and sensitive ovary. The pressure on the bladder brings frequent desire to pass water, with difficulty of retention; there is constantly a sense of weight and pain when the patient stands or walks for any time, and neuralgic pains occur in various parts.

Diagnosis.—This, as a rule, with the exercise of any care, is not difficult. A digital examination detects the solid body of the uterus lying anteriorly, and the angle of flexion marked by the presence of a sulcus, beneath which the cervix lies in the axis of the vagina, if it be not drawn out of position by any adhesions or cicatricial

contractions. Care must be exercised, *if the flexed cervix be drawn anteriorly, not to mistake the displacement for a partial retroversion or retroflexion.* The uterus occasionally, in anteflexion, lies low in the vagina, the process of descent proceeding at the same time as the forward displacement.

Having so far detected the anteflexion, it is well to make a careful examination of the vaginal roof, search the anterior and posterior fornices for any contracting bands, or any perimetritic effusions, while we ascertain with the finger the degree of mobility of the uterus. Still retaining the finger in the vagina, we make a careful abdomino-vaginal examination, determining the size and mobility of the fundus uteri. If doubt still exist as to whether the tumour be an intramural fibroid, or some effusion which may have formed in front of the uterus, we must complete the examination with the uterine sound. This we may find some difficulty in passing. It may have to be withdrawn, and a new curve given it according to the degree of flexion, before we can succeed. When we have introduced it, we can satisfy ourselves of the exact shape, direction, sensitiveness, and degree of mobility of the uterus, and judge of the space between the finger and the sound by feeling the instrument through the uterine wall. Should we experience a difficulty in passing the sound, in a case of anteflexion, we may assist the introduction of it by pressing up the fundus with a finger in the vagina, the handle being carried well back to the perinæum. If we succeed, the sound is brought steadily, but not forcibly or suddenly, forwards, and the fundus is raised. By such an examination as this, it is hardly conceivable that we can mistake the case of anteflexion for one of fibroid, or *vice versâ*, and overlook effusions, any old adhesions, or a vesical tumour or calculus.

Our conduct of the case by local interference will depend on—

(*a*) The discomfort caused by the flexion;

(*b*) The extent to which the uterus will support local measures, as the introduction of the sound, occasional reposition, the use of a stem;

(*c*) The presence of complications, as perimetritis, endometritis, uterine fibroids, adhesions.

Every case of anteflexion must be treated on its individual merits. When we find that local manipulation is ill borne, that any inflammatory conditions coexist, and that we fail, after reasonable and judicious efforts, to restore the uterus to its proper position, it is better not to push our effort to the borderland of rashness, but

simply, by careful attention to the bowels, by encouraging retention of urine and rest in the dorsal decubitus, by the application of the most comfortable vaginal support, and by periodical reposition with the finger, to make the patient's life as comfortable as it is possible. Otherwise the two indications for treatment are clear—the first, to restore the uterus to its normal shape and position; the second, to retain it by mechanical means in its proper place, while we correct the flexion and establish the patency of the uterine canal. The first indication is effected by the uterine sound, aided by the finger in the manner already described; the second object we endeavour to accomplish by a suitable pessary, and, if necessary, by the use of an intra-uterine stem to straighten the canal. The general principle of relieving local congestion, and treating any inflammatory conditions

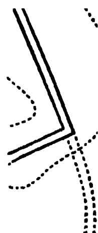


FIG. 190.—SIMS' OPERATION FOR CREATING NEW UTERINE AXIS.

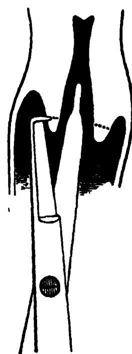


FIG. 191.—BILATERAL DIVISION OF THE CERVIX WITH KUCHENMEISTER'S SCISSORS.

of the endometrium, or the uterine appendages, before we trust to a mechanical support, is to be observed in the case of anteflexion. Proper dilatation of the canal with bougies, incision of the cervix, occasional depletion, careful attention to the secretions, are steps that must frequently be taken, independently of the use of any pessary. In short, when a case of painful anteflexion presents itself, our duty will be to subdue any local inflammatory state, and endeavour to replace the uterus. If the uterus be sensitive and congested, a few scarifications of the cervix will in all probability give temporary relief, while glycerine and icthyol tampons have both a sedative and depletive effect. The tampon is moistened with a mixture of one part of a ten per cent. solution of icthyol, one part of extract of hydrastis, one part tincture of iodine, and three

parts of glycerine. If there be stenosis (with dysmenorrhœa and sterility), we dilate the canal, commencing with a small bougie, and gradually increasing. It is well to take the curve of the canal on the first occasion, and preserve an outline of this for future guidance in shaping the bougie; meantime we should, when it can safely be done, at periodical intervals of some days, gently retrovert the uterus with the sound, replacing the pessary while the uterus is thus retroverted. The step that frequently gives the most relief is section of the cervix uteri, more especially the posterior incision advised by Marion Sims.

Incision of the posterior uterine wall is the safest and simplest step, and Kuchenmeister's scissors is the most convenient instrument to use. The probe point of the scissors should be introduced for about three-quarters of an inch, and the cervix divided not quite up to the vaginal reflection.

We now incise the os internum with Sims' knife, already de-

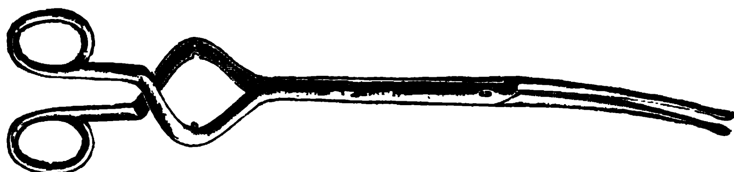


FIG. 192.—DILATOR FOR STRETCHING CERVICAL CANAL AFTER INCISION. By closing the handles the blades expand.

scribed, p. 158, which is the best instrument we can use, the operator having it directly under his control.

The patient is placed in the dorsal or Sims' position. The cervix is brought well into view, and is held securely by a tenaculum. The blade of Kuchenmeister's scissors is next introduced (the canal of the cervix may, if necessary, be dilated previously), and the posterior cervical wall is partially divided, as has been just described; Sims' knife is now taken and introduced through the internal os, and the posterior cervical wall is laid open. If any shoulder exists on the anterior wall, the knife should be directed to this, and it should be incised. Every precaution already insisted on when referring to division of the cervix for malformations and stenosis has to be taken. The operation should be performed a few days after a menstrual period. We must insist on the need for rest, and the greatest care until after the next menstrual epoch. The patient should be kept in bed for at least ten days. There is a certain, though slight, percentage of risk in all such operations.

Plastic Operation of D. Vulliet for Obstinate Stenosis of the Cervix.

In those cases of stenosis of the cervix which are ordinary forms of treatment by dilatation or otherwise, Professor Vulliet performs the following operation.*

The coexistence of chronic cervical catarrh is a contra-indication. After most careful antiseptic precautions—

(1) The cervix and vaginal roof are drawn downwards and backwards, so that they stand well displayed at the level of the vulva.

(2) A crescentic incision divides the anterior vaginal wall at its insertion into the cervix. The anterior vaginal wall is then carefully dissected, the separation being carried up the anterior uterine wall as high as the angle of flexion, so as to expose it. If the crescentic incision should not give sufficient room, a second incision perpendicular to it is made in the middle line of the vaginal roof. Then when the flaps are separated and carried to either side, a triangular wound results which offers abundant room. A sound is now passed into the bladder; if the base of the bladder be exposed in the wound, it must be pushed away and protected from injury.

(3) A long hollow sound is now passed into the uterus; the assistant who holds it turns the groove towards the operator, and carries the uterus forwards.

(4) The operator feels the instrument with his finger, and then introduces the point of the knife, and when he is sure that the point is in the groove of the sound, he prolongs the incision in the line to a point 1-2 mm. above the upper limit of the contraction. The knife is now removed and again introduced at the point in order to make a second horizontal, or rather spiral, incision, running round the left side of the cervix to end at the os externum at some point on the posterior aspect of the cervix, the length of this incision determining the length of the flap which is about to be raised. It is noteworthy how readily the flap can be cut in this way. When separated, the flap is seen to be triangular, and hanging from the right side of the cervix. Through this attachment the flap is nourished until it becomes united with the tissues in its new position.

(5) The apex of the flap is seized with forceps, carried to the point and fixed there with a stitch. One or two stitches on either side unite the flap with the walls of the incision.

It now only remains to close the wound in the cervix completely.

The T incision is to be preferred to the simple crescentic incision, because it gives freer access to the field of operation, and also permits of more satisfactory closure of the vaginal wound. The advantage is that it is easy to unite the point of the vaginal wound with that of the uterine wound. The ends of the suture introduced at the point are carried through the edges of the vaginal wound and then knotted. The ante-uterine cellular tissue is thus at once shut off. If the simple crescentic incision be employed, the upper uterine stitches are buried. It will be seen that a part of the flap is destined to remain vaginal; the upper part, on the other hand, which will lie above

* *Centralblatt für Gynäkologie*, Jan. 20, 1894.

the vaginal insertion, buried in the parametrium, must have its mucous membrane removed, or it cannot unite with the surrounding tissues; the mucous membrane of the lower part must not be removed. The mucous membrane should be removed immediately before the operator detaches the flap, otherwise the process will be tedious and difficult.*

With the view of obviating the tendency to closure of the cut surfaces after division of the uterus for anteflexion, and with the further object of straightening the canal, Dudley of Chicago has devised an operation associated with his name. George Keith, who had seen Dudley perform this operation, and had himself practised it, thus described its steps:—

As this operation may have to be performed on unmarried women, the smaller end of the smallest sized Sims' speculum, three-quarters of an inch in width, must be the one selected in such cases. It is thus unnecessary to rupture the hymen unless it be very small. The vagina is to be washed out, a tenaculum is to be fixed into the centre of the anterior lip of the cervix, and the uterus is drawn slightly downwards to strengthen the bend as far as possible. A sound is passed to determine the exact direction of the canal, which is then thoroughly dilated. This is followed by curetting, a large quantity of fungosities being usually removed. The operator then takes the tenaculum in the left hand, and with knee-bent scissors in the right cuts through the whole thickness of the posterior lip of the cervix almost to the vaginal mucous membrane. For convenience I propose to call the end of the cervix at the os the point, and the part where it meets the vagina the base. There are now two cut surfaces, the upper or right, and the lower or left, and each requires to be sutured separately. It will be seen that if the cut surface on one side is doubled on itself so that the point touches the base, and the same is done on the other side, the point, *i.e.*, the os, must be either drawn backwards or the base must be drawn forwards. What happens is that the point is drawn backwards. It is next fixed in this position by sutures. The stitches are put in in the following way: The needle is passed through the whole thickness of the point on one side and from the vaginal surface to the cervical, and in the reverse direction through the whole thickness of the base. The stitch is then tied, thus keeping the cut surface doubled on itself. A similar stitch is then put into the lower side, one stitch on each side being usually sufficient. In this way the incision, which was originally longitudinal, has become transverse, although in two halves.

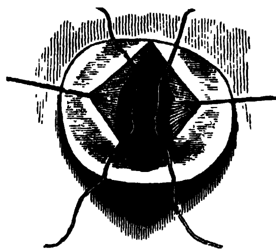


FIG. 193.—DUDLEY'S OPERATION. APPLICATION OF SUTURES. (Keith.)

Intra-uterine Stems.—I have said little of intra-uterine stems

* Eden, *British Gynæcological Journal.*

in the treatment of anteflexion, for two sufficiently good reasons: 1st. The cases are very rare in which, with judicious management, they are required, and when the flexion is such that a stem is indicated, it will be found in practice that the chances are about equal between success and failure from its use. 2nd. The risks incurred during the time a stem is worn, and the constant supervision required from the medical attendant, added to the carelessness of patients, which cannot often be prevented, render the employment of an intra-uterine stem peculiarly hazardous in busy general practice. One may be inserted for a few days periodically while the patient is kept in bed or lying down; but even when used thus it should be removed on the slightest sign of irritation. *Very rarely do I employ intra-uterine stems in my own practice.* I have a feeling of uneasiness during the time the stem is in the uterus, and always accompany its application with the strictest injunctions to the patient regarding rest and medical supervision. The precautions to be adopted when we determine to use an intra-uterine stem in anteflexion are these: (*a*) Never place a stem in the uterus immediately before a menstrual period; and, when one is worn, remove it on the approach of a period. (*b*) Always teach the patient how to remove the instrument by means of a string attached to the lower end of the stem, and direct her to do so on the least indication of uneasiness, the occurrence of pain, any chilliness, or feeling of general malaise. (*c*) Never place a stem in the uterus if there should be signs of past or present perimetritis or during an inflammatory state of the endometrium. (*d*) When possible, use a smooth, straight, or slightly curved stem, such as glass or celluloid (see author's stem, p. 158). (*e*) Never use an intra-uterine stem with external perinæal strap and support. (*f*) The stem should not reach the fundus of the uterus.

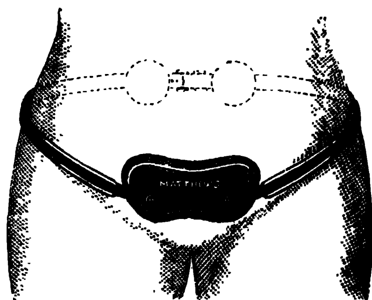


FIG. 194.—SUPRA-PUBIC SUPPORT.*

* This is a support, made for me by Matthews Brothers, consisting of two light springs and front and back pads; the front-supporting pad or pads are filled with air, the quantity of which is regulated by a little valve. The shape of the springs and general arrangement of the pads give a good upward and backward support, with a very soft resilient but firm air pressure. The support is very light and cool, and occupies little space, and is adjusted in a very few moments.

CHAPTER XI.

UTERINE DISPLACEMENTS (continued).

RETROVERSION AND RETROFLEXION.

By retroversion we understand a displacement of the fundus uteri backwards, so that it lies towards, or on, the rectum, while the cervix uteri is directed forwards towards the pubes. This inclination occurs in varying degrees, from a slight backward version to an extreme displacement, in which the os uteri is thrown upwards and forwards, and the body of the womb downwards and backwards. I am not here referring to the retroversion of pregnancy.

Causation.—Everything that tends to relax the uterine supports, increase the size and weight of the uterus, weaken the uterine wall, soften and congest the tissues, diminish the natural pelvic support of the uterus inferiorly and posteriorly, or draw the uterus backward by adhesion, may be included under the heading of causation. We thus find retroflexion frequently associated with pregnancy, laceration of the cervix, subinvolution, uterine fibroids, metritis and endometritis, rectocele, atonic or prolapsed vaginal wall, ruptured perinæum, adhesions, sedentary and standing occupations, neglect of the bladder. Retroversion is met with oftener in married women, and those who have borne children, than in the nulliparous. This we might anticipate from the occurrence of chronic hyperplasia, and laceration of the cervix and perinæum, as frequent consequences of labour. In women who have had several pregnancies and severe labours, we find these results complicated by atonic and relaxed, if not prolapsing, vaginal walls. These likewise predispose to retroversion. In these days of tight-lacing and contracted waists, when a fashionable woman's estimate of an accoucher's skill is measured by the tightness of a binder and the narrowness of her waist, retroversion is occasionally encouraged, if not produced, by unnecessarily tight squeezing and binding of the abdomen.

Symptoms.—These are the evidences of retroversion: pelvic discomfort, rectal and bladder pressure, distress in standing or walking, pain in the back and during defæcation. The gravity of the symptoms arising from retroversion or retroflexion has no definite relationship to the extent or severity of the displacement. We find the symptoms aggravated in mild cases, and at times almost absent in those in which we would expect to find considerable distress. Should an acute retroversion occur, which is rare, the immediate consequences are generally very severe; great pain, tendency to collapse, inability to stand, are amongst the most prominent. When retroversion has existed for some time, symptoms arise which are the secondary consequences of the pathological changes induced by the continued pressure on the rectum and

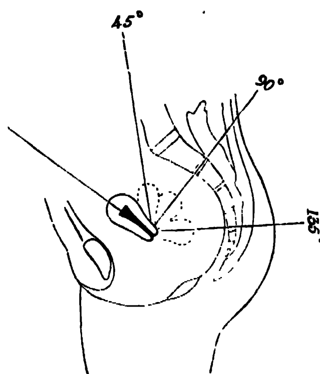


FIG. 195.—DEGREES OF RETROVERSION. (Schroeder.)

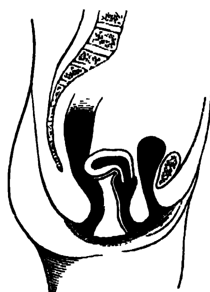


FIG. 196.—RETROFLEXION. (From Schroeder.)

bladder: dysmenorrhœa, menorrhagia, sterility, cystitis, and rectitis. Should conception occur and the womb be retroverted, or should it be displaced during the early weeks of pregnancy, it is not unusual for the patient to abort from the third to the fourth month, when the uterus enlarges and the irritation and distress increase.

Diagnosis.—By a digital examination we may detect the cervix uteri directed towards the symphysis pubis, and the round mass of the fundus resting on the rectum. These signs at once indicate retroversion. The extent of the fundal tumour, felt posteriorly, affords a rough measure of the degree of displacement. The combined method of examination, and the use of the uterine sound, will clear up any doubt. Before we pass the sound, we must remember that pregnancy and retroversion are not uncommonly co-existent.

The uterine sound is not to be employed until we can satisfy ourselves that the woman is not pregnant. We have to beware of the error of mistaking a fibroid tumour in the posterior wall of the uterus, a hæmatocele, an effusion (either cellular or intra-peritoneal) for the retroverted or retroflexed uterus. The history of the case, the conjoined examination, the uterine sound, and reposition of the uterus, should prevent this error. I have, however, many times known concretions in the rectum, perimetric effusions, and more frequently interstitial fibroids, mistaken for retroversion.

Treatment.—Our first duty is to replace the uterus. In all first efforts to effect reposition, it is best, whether on a couch or in bed, to place the patient in the semi-prone position. If there be still difficulty, the woman should be put in the knee-pectoral position, her chest being brought well down on the couch, and advantage taken, at the moment of reposition, of a strong expiratory effort on the part of the patient. In some cases counter-pressure may be made in the dorsal position, between the hand on the abdomen,



FIG. 197.—REPOSITOR AND SOUND OF AUTHOR. Handle to serve as repositor. Elbow may be replaced by ivory-cupped end (see page 251).

pressing down the cervix, and the fingers of the other hand, in the vagina, which elevate the fundus. *In all these manipulations the bladder and rectum should be empty.* Sometimes the retroverted uterus is congested, tender, and sensitive. In such a case it may be well to combine periodical reposition by the fingers, or an extra-uterine repositor, with occasional depletion, the use of the hot douche, and the introduction of a glycerine plug at night, before we permanently replace the uterus and apply a pessary. But this necessity is rare, and when it is practicable to do so without much force, the uterus should be restored to its normal position, and a pessary adapted to the size of the vagina and the cervical development of the uterus.

The best repositor is the finger, and if it fail, the uterine sound. This, used with delicacy and caution, is the safest, most effectual, and the simplest intra-uterine instrument for surgeons. To replace the uterus, we use the semi-prone or knee-elbow position; carrying the index and middle fingers of the left hand into the vagina, and resting these against the uterus, we press

the fundus steadily forwards. Should this not rectify the displacement, we may place the index-finger of the right hand against the cervix anteriorly, and press it backwards towards the sacrum. We often succeed by alternating these efforts. The author's extra-uterine repositor, or elevator, will be found a useful instrument (Figs. 197 and 211). We may readily thus succeed in reducing by the fingers a retroverted uterus. This plan should always be tried before we use the sound as a repositor.

We can exert greater power with the fingers introduced into the rectum, directing the pressure against the fundus, while the woman is in the knee-elbow posture. I have never seen any harm accrue from judicious attempts to replace the uterus with the sound. The modified outline diagram (Fig. 199) shows the method of rotating the sound, and the sweep given to the handle during reposition.

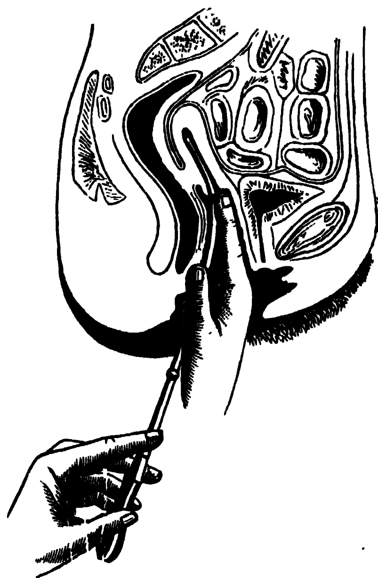


Fig. 198.—Introduction of Sound before Rotation. (Hart and Barbour.)

Having introduced the sound, the roughened face of the handle being directed backwards, the operator takes it lightly in the left hand, and carries it, with a gentle sweep, upwards and forwards to the right, while the handle is made to describe a semicircle, and the intra-uterine portion of the sound is thus gently rotated; finally the handle is carried well back to the perinæum. That the uterus may, through the presence of adhesions, resist all attempts at reposition, is not to be forgotten. To an experienced hand, the degree of resistance, both to finger and sound, indicative of such an impediment, is readily discernible, but this is not so in the case of the inexperienced, and therefore all the more care must be exercised by beginners in using the sound for the purpose of replacement.

When the os uteri is directed far forwards we may not be able to introduce the sound in this manner. The handle may have to be

directed anteriorly under the pubes, and, when introduced, the fundus must be first partially raised by pressing on the centre of the sound with the finger of the right hand, before the rotatory sweep is made with the left. *The sound is not to be introduced and simply rotated on its axis.*

Should a flexion complicate the displacement, the sound must be curved according to the degree of flexion. We may not be able to straighten the uterus. The same caution must be exercised, and

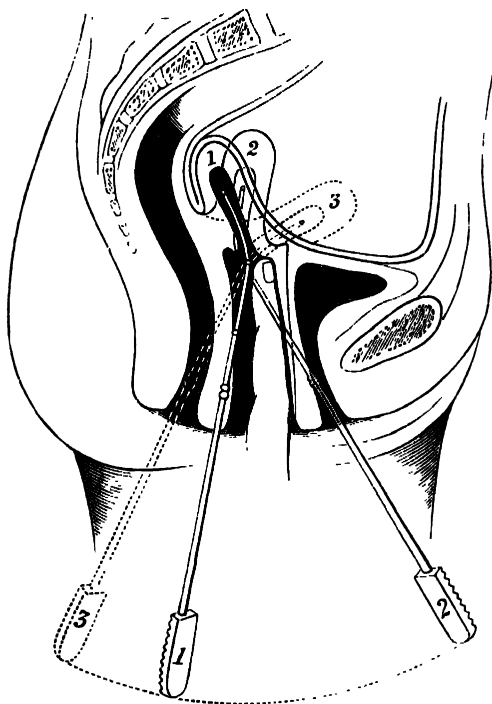


FIG. 199.—ROTATION OF SOUND IN RETROVERSION. (Adapted from Hart and Barbour.)

the same means adopted, as in the case of anteflexion. Any previous inflammatory condition has to be controlled. The uterus may be partially straightened by the uterine sound, and still more so by conjoined recto-vaginal manipulation, the index-finger of the right hand in the vagina pressing downwards and backwards the cervix, while the index-finger of the left in the rectum presses steadily upwards and forwards the fundus. The manœuvre is best effected in the knee-elbow position. *The sound requires, in its use, gentleness*

and patience. The ill effects attributed to it are generally the consequences of ill-advised and unjustifiable force, or of its introduction at improper times.

In the treatment of retroversion, I wish emphatically to state my experience, that with judicious and patient manipulation of the uterus by the postural method, careful reposition by means of the sound, and contemporaneous adjustment of a suitable pessary, the necessity for heroic interference is, in the great majority of cases, obviated. I have notes of a number of cases, in which operation was advised, now completely and permanently cured, some of these women, in whom this method of cure was followed, having become pregnant and borne children.

G. Bouilly (*La Gynœcologie,* February, 1896) emphasizes the opinion that, while not denying the success of various operative procedures, we may obtain the same result by more simple means. *Abdominal hysterorraphy will probably alone survive, but it should be reserved for those complicated cases in which there is a lesion of the adnexa.* The operation is demanded rather by such lesion, or a perimetritic trouble, than by the simple displacement. The remedy is more often in the well-chosen and well-applied pessary. He divides into two classes sufferers from this displacement: those in which the vaginal perinæal floor is defective, and those in which it is perfect. In anteversion he retains the pessary for a longer period than in retroversion, that is, from eight to twelve months. See pp. 252, 254.

When we have succeeded in replacing the womb, our next object is to retain it in its normal position. In obstinate or difficult cases there is no better pessary for retaining a replaced uterus in its position than that of Fowler, already described. When by manipulation we have reduced the uterus, a pessary of the proper size is selected and introduced. This should be worn constantly for some time. I have had more *permanent* satisfactory results with this pessary than with any other. After a few months it can be replaced by a suitable Hodge.

Larger sizes than those usually sold I have specially made for me by Arnold. They are required in old-standing cases of retroversion with vaginal prolapse. In those cases in which there is tenderness and sensitiveness, it is well to prepare the patient by the application, three times in a week, of an antiseptic tampon of salicylic or boric acid wool soaked in glycerine, which is pressed up into the posterior fornix of the vagina, so as to push forwards the fundus; while by a second tampon, applied below and in front of the cervix, this latter is pushed back; the superior plug is thus assisted in its action on the fundus. Both plugs are finally retained in position by a roll of antiseptic wool passed into the vagina. In a large number of cases, however—in fact, this is becoming more the daily habit with me of late years—I mould on the spot the pessary

in size and shape that I deem most suitable, out of the celluloid rings (Figs. 205–209) I have at hand.

There can be no doubt that the pessary which is capable of adaptation to most cases of retroversion is the lever-pessary. I quote here Goodell's remarks in describing the lever action of this support; they should be read by any one who applies a support to the uterus.

'As its name indicates, this pessary acts on the principle of a lever; but the mechanism of its action is twofold. By stretching the vagina upward and backward, it draws the cervix in the same direction. The womb then turns on its central point of ligamentous attachment as on a fixed pivot, and the fundus is consequently tilted forwards. The womb itself thus becomes a lever, of which its point of attachment to the bladder is the fulcrum. The power is applied to the cervix, and the fundus becomes the weight, or resistance. This action remedies retroversions, but not retroflexions, unless complicated with retroversion, as they usually are. The anterior vaginal wall, with the visceral pressure above it, now becomes the power applied to the lower limb, or "long arm," of the lever; the posterior vaginal wall is the fulcrum, or support; and the upper limb, or short arm, lying behind the cervix, directly pushes the weight or fundus uteri. This action tends to remedy both retroflexion and retroversion. For instance, during the act of inspiration the descending diaphragm crowds down the abdominal viscera upon the bladder, to which are attached the cervix uteri and the anterior wall of the vagina. These organs, therefore, descend. As a result, the lower or fore end of the lever is necessarily pushed down by the descending anterior wall of the vagina, on which it rests, while its upper or hind end proportionately rises up and tilts forward the retroverted or the retroflexed fundus. In expiration, the reverse takes place. The pressure is, therefore, not a steady, but a gentle rocking one, which is the most efficient of all. This, also, is one least liable to inflict injury on the soft parts, because the points of pressure are varying ones. But to attain these ends the pessary must be mobile, *and never so long as to put the vagina on the stretch; otherwise it loses its distinctive character of a lever, and degenerates into an ordinary ring pessary. It should further impinge on the soft parts only, and take no bearings on the solid structure of the*

Arnold makes a modified Smith-Hodge with a cushion posteriorly

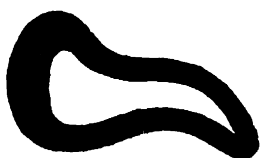


FIG. 200.—THOMAS'S MODIFIED SMITH-HODGE. To be had in celluloid.

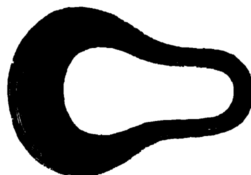


FIG. 201.—ARNOLD'S GLYCERINE PAD.

full of glycerine, and of the shape shown in Fig. 201. It is a most

useful pessary in those cases in which there is a sensitive fundus or ovary. Similar pessaries are made with the cushion filled with air. I prefer the glycerine. Neither of these pessaries is very durable. They are apt to lose their shape.

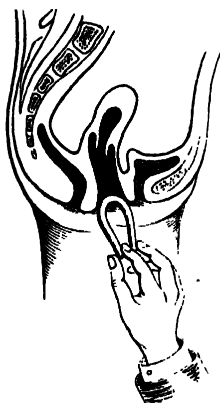


FIG. 202.—FIRST STEP OF INTRODUCTION.

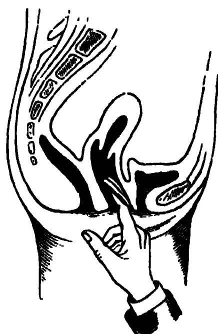


FIG. 203.—SECOND STEP OF INTRODUCTION.

To introduce Hodge's pessary, bring the woman, on her back, or in the semi-prone position, over the edge of the couch or bed, with the knees well drawn up. The pessary is now taken in the



FIG. 204.—SMITH-HODGE PESSARY IN POSITION. (After Goodell.)

right hand, while the labia are held lightly apart with the fingers of the left, at the same time that the perinæum is pressed in a

downward direction. The pessary, with its uterine or longer end in a line with the vulvar orifice, is now passed into the vagina, the principal pressure being directed on the perinæum; when the support has completely passed the vulva, the fingers of the right, or

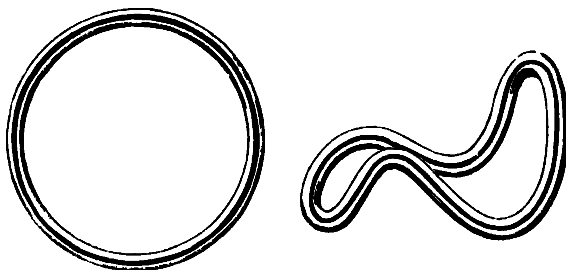


FIG. 205.—A CELLULOID RING. FIG. 206.—SAME FINALLY MOULDED FOR A CASE OF RETROVERSION, SHOWING THE POSTERIOR ARM CURVED TO SUPPORT THE UTERUS.

I cannot speak too strongly of the advantages of keeping ready at hand several sizes of these rings, as made for me by Messrs. Arnold. Having carefully examined the vaginal roof, and noted the size required, a few rings

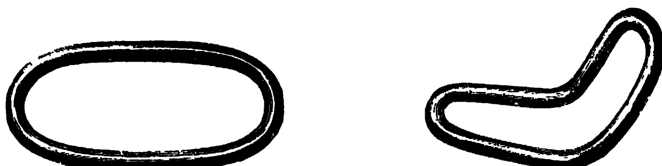


FIG. 207.—FIRST SHAPE. FIG. 208.—SECOND SHAPE.

are taken and thrown into a basin of very hot water; when they are pliable, one is given the shape shown in Fig. 207. The ring is again thrown back into the water for a few seconds, and on being withdrawn it is given the form shown in Fig. 208.

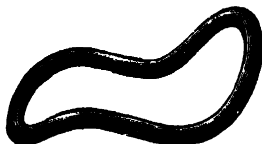


FIG. 209.—THIRD SHAPE.

It is again immersed, and after removal the second curve is made (Fig. 209). After a few seconds' final immersion, the pessary may be made to assume the exact shape desired, and the arms of the lever brought to the proper length and angle required (Fig. 206 shape advised). The pessary is next thrown into cold water, and left in it for a few minutes to set.*

* I now use the red celluloid rings; they are not so liable to crack in moulding, and they keep better than the transparent kind.

conducting hand, are changed so as to turn the pessary half round on its long axis, thus bringing the concavity of the large curve to point forwards to the interior vaginal wall. This is the moment of greatest pain to the woman, and any bungling in rectifying the position of the pessary, as it lies pressing on the front of the cervix, causes still greater discomfort. The index-finger of the right hand is therefore quickly transferred to the upper bar, which is hooked or pressed down, so as to glide over the cervix into the vaginal cul-de-sac behind. The pessary is now carefully explored, its relation to the cervix ascertained, the degree of tension of the vaginal roof felt, and the exact position of the uterus determined, before we permit the patient to rise. Smith's pessary acts best when the lower bar presses on the soft and yielding anterior wall of the vagina, instead of on the pubic bones. It is well always to explain to the patient, or friend, the exact position of the pessary in the passage. If uneasiness should follow, we should instruct her how to remove it, by pulling, not too forcibly, on the lower bar, and by

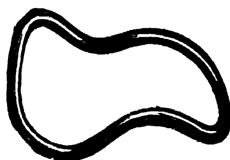


FIG. 210.—METAL SMITH-HODGE.

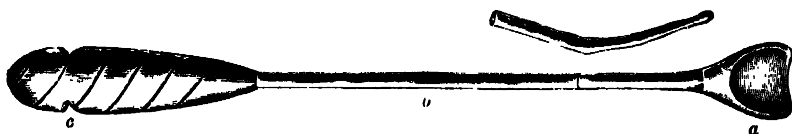


FIG. 211.—AUTHOR'S EXTRA-UTERINE ELEVATOR AND REPOSITOR.* *a*, cupped ivory head; *b*, shank of silver; *c*, aluminium flat roughened handle, notched to hold cotton-wool, and form a soft pad. (Arnold.)

turning the instrument on its long axis and gently withdrawing it. If a case of retroversion should resist the application of a pessary, the one lesson every prudent practitioner has to learn is patience. By the daily practice of the knee-elbow posture, local measures directed to reduce congestion or inflammation, habitual reposition,

* This instrument (Fig. 211) can be used with advantage in the knee-elbow position to press the fundus forwards. The roughened handle retains a thick layer of cotton-wool, which can be used for the same purpose. The ivory cup, *pro* head, has smooth rounded edges. This is useful to keep the uterus forwards, while we tamponade the posterior *cul-de-sac.*

Fig. 197 shows the cup removed and replaced by the sound. The flat end can be introduced, protected by a covering of leather, into the rectum, and the elevator thus be applied to raise the fundus in the displacement of pregnancy.

and the education of the vagina and uterus to the presence of a well-fitting pessary, we ultimately conquer.

Schultze practises careful stretching, in the lithotomy position, of all adhesions which keep the uterus in its false position. This is done under an anæsthetic, the rectum and bladder having been thoroughly emptied. The rectum is irrigated with warm water. The index and middle finger of the left hand are passed into the rectum, and the thumb of the same hand into the vagina. The other hand is placed on the abdominal wall. Having determined the situation and nature of the adhesions, these are gradually stretched without any tearing, at the same time that the uterus is raised. I have learned from experience that much can be done by manipulation to free recent adhesions. It has been my practice in cases in which I found them interfere with reposition, to place the woman in the knee-elbow posture, and both by rectum and vagina to manipulate the uterus for some days before trying reposition with the uterine sound.

When we find that, despite our efforts and the use of a support, the uterus still refuses to remain in its normal position in the pelvis, or when the adhesions are such as to make us despair of restoration, the course to be recommended is vaginal or ventrofixation, or round ligament shortening, or some modification of this operation. This advice must be influenced by the calling of the woman, her needs in domestic life, and the duties demanded of her. (See remarks on Ventrofixation.) It is not possible for many sufferers from a serious displacement to continue their employment or home duties. Such women cannot afford the time or expense needed for manipulative treatment, and cannot be consigned to the lifelong use of a support. Operation is the rational and correct treatment to advise for such patients.

Retroflexion.

In retroflexion the fundus is bent backwards on the cervix, and lies against the rectum. Retroflexion may be a congenital affection, due to arrest of development of the posterior uterine wall, and may remain undetected even after puberty. In practice, however, we have nearly always to treat that displacement which is secondary or acquired.

Causation.—We may refer to the causes of retroversion when we inquire into those which are productive of retroflexion. It is not

difficult to understand how the uterus, still softened and enlarged after pregnancy, with strained and relaxed ligaments, or with the perinæal support injured and weakened, may, while it is in a state of subinvolution, yield to abdominal or pelvic pressure, and bend at the axis of suspension. In those cases in which there is an enlargement in the posterior wall, either as the consequence of congestion or hypertrophy, or an intramural fibroid, we can readily understand the occurrence of retroflexion. The flexion is, as a rule, preceded or attended by version. Contraction of the uterine canal leads to stenosis and obstruction to the menstrual flow, while the consequent congestion of the uterine tissues in the fundus, and the increase of weight, still further encourage the tendency to uterine prolapse and flexion. As in anteflexion, cause and effect react on each other; the longer the displacement lasts, the larger the uterine fundus becomes, and the more acute the angle of flexion.

Diagnosis.—In examining with the finger the retroflexed uterus, the os uteri is at once reached, occupying almost the vaginal axis, while the fundus is found as a solid mass, filling the posterior cul-de-sac, and a well-defined sulcus separates the cervix from the fundus. The flexion is distinctly traceable with the finger. We confirm the diagnosis by both recto-vaginal and utero-vaginal examination. Carrying the index-finger of the left hand into the rectum, we feel the fundus through the rectal wall, and encroaching on it; with the finger of the right hand on the cervix, we can draw on the uterus, and so detect the mobility of the tumour and the conjoined movement of the cervix and fundus. It is only in those comparatively rare cases where the uterus is enlarged and fixed by adhesions or recent effusions that any doubt can exist after a careful vaginal and bimanual examination. To confirm our diagnosis, we pass the uterine sound, but in doing this we must exercise even greater caution than in retroversion. The difficulty will depend in a great measure on the degree of flexion. The sound must be well curved, corresponding to the curve of the uterine axis; the handle is taken lightly in the right hand, with the concavity of the instrument directed forwards. Guided by the finger of the left hand, the knob is introduced as far as the internal os; by a *tour de maître* the direction of the sound is reversed, the concavity being directed backwards, and the handle carried well forward towards the pubes. Assistance can at the same time be given to facilitate its passage into the uterus by raising the fundus with the finger of the left

hand in the vagina. In those cases in which the os is directed far forwards and is high in the pelvis, the sound must be introduced with the concavity turned towards the sacrum.

Treatment.—All that has been said in regard to the management of retroversion applies with equal force to retroflexion. A suitable pessary has to be inserted when the uterus is replaced and the curve rectified. In the retroflexed womb, however, there is the flexion in addition to be corrected. The sound may have to be periodically passed. If we determine to use an intra-uterine stem, we have to bear in mind all the precautions (p. 241) to be taken both before introducing the pessary and during the time it is worn. The plan recommended by Schroeder is a safe one—to place the

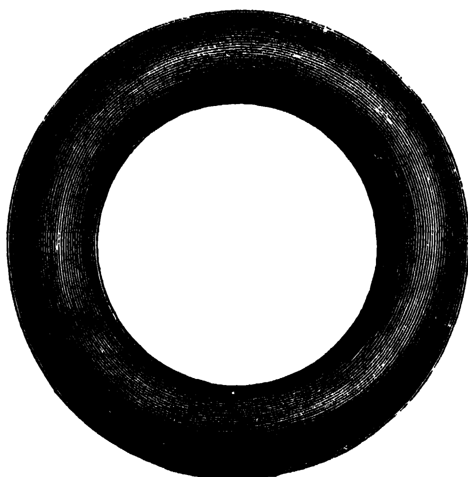


Fig. 212.—Glycerine Ring. No. I. (Actual size.)

stem for the first few days in the retroverted uterus, and not to attempt replacement until it has been thus worn for a little time.

When we have replaced the uterus, we must endeavour to retain it in position by one of the forms of pessary recommended for retroversion—more especially Fowler's cradle pessary, or a Hodge suitably moulded. The question naturally arises, What is to be done to relieve the patient in those unfortunate cases in which rectification of the displacement is impossible, and the retroflexion incurable?

Here operation should be urged, that the woman's life may be rendered useful and comfortable. If she refuse to consent to this, some relief may be obtained from the use of a soft rubber and

glycerine ring to steady and fix the uterus, or a modification of Hodge's soft pessary moulded to suit the case.

We must insist on careful attention to the rectum and the frequent emptying of the bladder. Occasional depletion and the use of the warm douche are indicated if there be congestion and uterine sensitiveness. If there be dysmenorrhœa associated with the displacement, the canal of the uterus may require division and subsequent dilatation.

Various Operative Procedures for raising and fixing the Uterus in Cases of Retroversion and Retroflexion.

Alexander's Operation.

Alexander, struck with the insufficiency of pessaries in many cases of prolapsus and retroversion, was the first to try the effect of raising the uterus and fixing it by means of the round ligaments.

He rightly insists that the operation is one proposed to rectify displacement and maintain the uterus in a replaced position. It is not intended as a cure for all the antecedent or attendant, and many of the consequent, ills from which women who have had retroversion suffer.

I give the stages of the operation as described by the originator of the operation himself :—

'The patient should have her bowels and bladder emptied, and be put under chloroform or ether. The pubes are shaved on either side from the spine outwards. The pubic spine is felt with the fingers, and an incision made upwards and outwards from that point, from one to two inches in length, in the direction of the inguinal canal.

'The greater or less length of the incision depends on the amount of fat that covers the abdominal parietes. In thin subjects, and by experience in the operation, the length of the incision may be much lessened. By subsequent incisions the depth of the wound is increased until the tendon of the external oblique muscle is reached.

'The external abdominal ring is now to be looked for, and if not at once seen, will be easily found by searching for the oblique fibres crossing it, and for a small morsel of fatty tissue issuing from its inner end. In some cases the external ring is so well concealed that inexperienced operators have some difficulty in finding it. The pubic spine, the oblique fibres that cross the external abdominal ring, and the fatty protrusion at its inner end, are the landmarks that will readily guide the operator who has a fairly practical knowledge of the anatomy of that region. In the first incision a small artery (the superior external pubic) is sometimes cut across. It is the only vessel in danger. As a general rule the operation is bloodless.

'The oblique fibres crossing the external abdominal ring should next be cut

across in the direction of the inguinal canal. A reddish tissue now bulges out, so characteristic in appearance as to be easily recognized, mixed with a greater or less quantity of fat. This is the end of the ligament, *as a ligament*, just before it spreads out in the mons veneris. An aneurism-needle is now passed under *all* this fatty mass, so as to raise it out of the canal and allow it to be grasped by the fingers (not by the forceps).

'We have now reached the most delicate part of the operation. The ligament should be gently pulled out, and all bands connecting it to the pillars of the external abdominal ring or to the neighbouring structures should be cut through. The accompanying nerve should also be cut across. In tearing the ligaments from their inguinal connections, some risk is run of breaking them or of tearing them away altogether, unless much care, patience, and judgment be exercised. As soon as these adhesions are overcome, no further trouble is experienced. The ligaments pull out with the greatest ease, and appear as white, strong, substantial cords.

'Having ascertained that both ligaments will run, the uterus should be placed in the desired position by the *sound*, and maintained in that position by an assistant, whose finger also touches the uterine cervix. The ligaments are now pulled out until they are felt to control the position of the uterus. The best rule, especially for beginners, is to pull out the ligaments as far as possible and then slacken them a little before stitching, to give them a little "play." This method favours union by the first intention.

'When the ligaments are pulled out to the required extent, they are held by an assistant while the operator fixes them to the pillars of the external ring and to the edges of the wound in the following manner:

'A curved needle threaded with fine silkworm gut or silk, or fine silver wire, is passed through the outer part of each pillar of the external abdominal ring and through the intervening ligament and tied loosely as a buried suture. Another suture is passed in like manner internal to the first. These sutures should not be pulled so tight as to strangle the ligament. A small drainage-tube is passed into the canal for about a quarter of an inch to prevent any collection there, and so eliminate the only danger of the operation. It protrudes at the inner angle of the wound. The chafed parts of the slack of the ligaments may now be cut off, the bleeding ends ligatured, and the remainder stitched into the wound by means of the two sutures that are generally sufficient to bring the edges of the wound together. These stitches may be of silk, silkworm gut, catgut, or chromicized gut. I prefer the silkworm gut. I have tried catgut for the deep sutures, but have been disappointed with it. It gives way too soon, and was the cause of failure in two cases.'

Alexander writes me (1899) with regard to his operation, that the only important addition that he has made to his original method is, that where adhesions are present he opens up the pouch of Douglas, and breaks up the adhesions with the finger, removing by this route adnexal cysts and hopelessly diseased ovaries, then shortening the ligaments and draining the pelvis by gauze.

The toilet of the operation can be completed with ordinary aseptic dressings and the usual precautions.

'I now place a suitable Hodge pessary in the vagina and withdraw the

sound. The patient's knees are flexed over a pillow, as after operation for hernia, and a morphia and atropine injection, if necessary, is given to relieve pain.

'The subsequent dressings depend on circumstances, and, as a general rule, the wounds heal by the first intention if strict antiseptic precautions are used and the ligaments not pulled so tight as that one is strained by the other. If the buried sutures give trouble and produce a sinus that does not readily heal, the sinus should be opened up and the irritating suture removed. When old-standing or acute retroflexion is treated by this operation, a substantial stem-pessary should be inserted as well as a Hodge, and maintained for about a month, or until the recoil of the straightened uterus has disappeared. I now use ebony stems of the same size with a broad, ponderous bulb. These maintain their position admirably while the patient is lying down, and they should always be removed at the end of the recumbent period.'

Modification of Alexander's Method.

Kocher, of Berne, modifies Alexander's operation by slitting up the anterior wall of the inguinal canal, so as to gain ample space to isolate the ligaments and obtain room for conducting the operation. He draws on the ligaments in the direction of the anterior superior iliac spine, stitching them on the aponeurosis of the external oblique muscles.

Parker Newman, of Chicago, carries an incision an inch and a half to two inches in length parallel with Poupart's ligament, midway between the spine of the pubes and the anterior superior spinous process of the ileum, directly over the canal of Nuck. He thus exposes the glistening aponeurosis of the transversalis muscle. This he nicks, and passes a blunt hook into the canal, and with it pulls out quickly the round ligament and secures it. The same procedure is carried out on the opposite side. Both ligaments are drawn upon, and the reflection of the peritoneum surrounding them is pushed back. This leaves a loop of ligament on either side about four inches in length, which is stitched together, and thus the ligaments are firmly fastened into the aponeurosis and walls of the canal by buried animal sutures. The patient is kept in bed for three weeks or more after the operation. He claims that by this plan we draw on the strongest portion of the ligament, that we anchor it more surely, guard against hernia, and in no way interfere with the external ring, while the operation is a comparatively rapid one.

Mundé's Modification of Alexander's Operation.

1. Accurate location of the pubic spine, which is reached by an oblique incision in the direction of the inguinal canal. Generally the protrusion of a little fat indicates the position of the terminal fibres of the ligaments. All bleeding is restrained.
2. Laying bare of the pillars of the ring, the whole mass of fat and tissue lying in it being raised up and an aneurism-needle passed under it close to the bone. This is done with the handle of the scalpel.
3. Traction of the mass when loosened exposes the attachments and fibres of the ligaments.

Lapthorne Smith (*Amer. Gyn. Soc.*, May, 1897), who has performed a very large number of operations, lays aside all cutting instruments as soon as the skin, superficial and deep fascia are divided. He protests against the laying open of the inguinal canal, and does not cut a single fibre of the inter-columnar fascia, the principal support of the fibres; nicking the fibres of the internal oblique made a false passage and failure in finding the ligaments, and increased the risks of hernia. In fifty-three cases of Alexander's operation he has had only one relapse.

Lapthorne Smith is emphatic on the need for careful discrimination of the cases which require ventro-fixation from those in which Alexander's operation is indicated. In the former operation he has had but one relapse in ninety-four patients on whom he operated.*

Operation of Edenbohls.

Edenbohls seeks for the round ligament higher up in the canal than the external ring, and he opens the canal in its whole length, guarding the ilio-inguinal nerve in drawing out the ligament. He slips back the inverted peritoneum, and shortens the ligaments from seven to ten centimetres. The technique of his operation is as follows :—

The buried running suture applied at the upper angle and inner side of the wound, the first sweep of the needle, threaded with chromicized gut, pierces the aponeurosis of the external oblique, the underlying internal oblique and transversalis muscles, the margins of the internal ring, the round ligament as it emerges between them, and the projecting shelf of Poupart's ligament. The succeeding loops of the deep row of sutures, three or four in number, pierce the internal oblique, the transversalis, the round ligament, and Poupart's ligament; the last loop penetrates the outer pillar of the external ring and so emerges upon the outer surface of the external oblique aponeurosis; with still the same strand of catgut, the inner pillar and the round ligament are pierced and fastened to the outer pillar, and finally the lips of the incision in the external oblique aponeurosis are united with the same strand continued upwards as a running suture. The skin is sutured and wound closed without drainage. Prior to doing this operation, he curettes the uterus and does whatever plastic work the conditions presenting in each case call for.†

Statistics of Alexander's Operation.

Doléris in 1898 published the analysis of ninety cases, the last of a series of four hundred, of Alexander's operation. In four of the series the adnexa were removed, and the round ligaments were fixed in the laparotomy wound. There had been two deaths from iodoform intoxication and strangulation of the colon, not from peritonitis. In seven cases the results were unsatisfactory in

* See also p. 273   † *Amer. Gyn. and Obstet. Journ.*, Dec., 1896.

consequence of pregnancies, and the attempt to cure the retroversion by shortening one ligament alone.

Kellog (Michigan) had before 1895 performed Alexander's operation four hundred times without losing a patient, and had only 5 per cent. of failures. This result does not quite coincide with those of other operators so far as failure to effect a cure of the retroversion is concerned. Irwine has proved that careful discrimination must be shown in the adaptation of any particular method of operation to the case under consideration. Foremost of these considerations are the chances of pregnancy, the presence of adhesions, and the nature and duration of the retroversion. There will always be the tendency to hernia and the risk of recurrence.

VAGINAL FIXATION.

Extra-peritoneal Vagino-fixation (Müller's Operation).*—After preliminary curetting of the uterus, and application of 50 per cent. solution of carbolic acid, which should not be omitted on account of the frequent co-existence of endometritis with backward displacements of the uterus, and likewise because of the possibility of a suture entering the uterine cavity, and consequent danger of infection, the uterus is pushed into the position of anteflexion by means of Orthmann's instrument, and drawn strongly downwards. The anterior vaginal wall is then cut from the point of its insertion into the cervix up to the meatus urethræ, but not reaching the latter by 2 cm. If cystocele be present, a vertical oval of mucous membrane is marked out and at once removed.

The author preferably carries this denudation close to the urethra, so as to remove the strong protrusion of the urethra so often left after labours, and which is, by its feeling of bearing down, the beginning of prolapse of the anterior vaginal wall.

After this the bladder is separated from the vagina through the incision, and with the half of a knife from the cervix ; the fingers may also aid in this. For this purpose also a solid catheter is passed into the bladder. The latter is drawn away from its connections, and held up by a retractor, or fixed in its displaced position by a few temporary catgut sutures. It is only by this thorough careful separation of the bladder in the first stage that injury of it by the sutures, or pressure upon it by the uterus, can be avoided, and, in case of pregnancy, this allows of uterine

* From Edge's admirable description of the operation (*Brit. Gyn. Jour.*, Aug., 1896).

expansion without dragging the bladder up. If the uterus should not be large, and if it be movable, it protrudes from the incision after the bladder has been drawn up. It is then easy to reach the peritoneum on the anterior uterine wall, and its point of reflection upon the bladder. Half a dozen strong catgut sutures are next passed transversely in the anterior uterine wall, beginning at the wound above. The points of entrance and exit of the stitches are 2 cm. apart. Then these stitches are carried through the edges of the wound 1 cm. from the margins. The sutures are not tied yet, but the vaginal wound is closed with a continuous catgut suture from the urethra to the cervix. Orthmann's instrument is removed, and then the sutures are tied in the order of their insertion. The cervix is pushed upward and back as far as possible, and pressure applied from above on the fundus puts the uterus into an advanced position of anteversion, in which it is fixed by firm tamponade of the vagina with iodoform gauze. The bladder is freed. The patient is kept in bed for eight or ten days. The catheter is used if necessary; the gauze is removed, and astringent vaginal douches are given. Secondary treatment generally extends over eight or ten days. Usually the operation is easily performed without any trouble.

The advantages of this operation are: It is performed in the vault of the vagina; it is less dangerous than others; convalescence is speedy.*

Mackenrodt, recognizing the danger of adhesions which cause anteflexion from Dührssen's method of fixing the uterus to the vagina outside the peritoneum, has lately performed, as we have already stated, vesico-fixation. In this operation there are the dangers of peritoneal hæmorrhage, perforation of the intestine or bladder, and last, though not least, sepsis. In many of Mackenrodt's cases of vagino-fixation, the patients complained of bladder troubles, and at times pyosalpinx resulted. If vagino-fixation be necessary, he operates by separating the bladder from the uterus and opening the abdominal cavity; the anterior flap of the peritoneum is stitched to the top of the uterus, and then the posterior surface of the bladder to the front of the uterus, thus closing the vesico-uterine pouch. [This operation would be better called vesico-fixation.—AUTHOR.] Olshausen approves of ventro-fixation rather than vagino-fixation. The general tendency in the discussion, including the views of Bokelmann, Flaischlen, Hossman, Czempin, Winter, and Ruge (who prefers Alexander's operation), was not favourable to vagino-fixation.

Operation of Colpotomy and Intraperitoneal Vagino-Fixation.

The steps of the operation of anterior colpotomy, which in November, 1896, when I was with Martin in Berlin, he had

* See p. 271.

performed over 390 times, with a mortality of four cases, are as follows:—The genitals having been shaved, and the thorough disinfection of the vagina secured, the woman is brought well to the

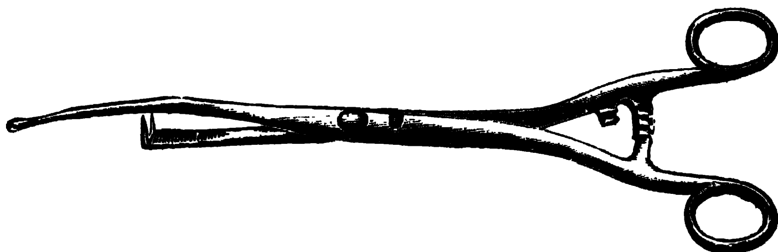


FIG. 213.—ORTHMANN'S INSTRUMENT.—COMBINATION OF SOUND AND CLAW FORCEPS.

edge of the table, a capable assistant at either side holding the thighs apart. The operator sits in front, the uterus is drawn down, and its length and position are ascertained by the sound. The



FIG. 214.—A. MARTIN'S PERINÆAL RETRACTOR.

cavity is next curetted, and any *débris* laid aside for examination. It is now washed out with a pipette, and a little perchloride of iron solution is injected. Orthmann's combination of uterine sound with



FIG. 215.—VULCANITE PIPETTE.

claw forceps is now taken, and the sound extremity having been passed into the uterus, the neck is seized, and the uterus is drawn downwards, so as to place it and the anterior *cul-de-sac* well on

the stretch. One of the assistants seizes the vaginal retractor below the urethra, drawing it well up out of the way, at the same time that, *with the same hand*, he directs the stream of aseptic fluid from an irrigating pipette over the parts, and this continues to play through the entire operation. The operator, thus fixing and stretching the uterus with one hand, carries an incision directly in the middle line through the mucous membrane. (If it be desired to do

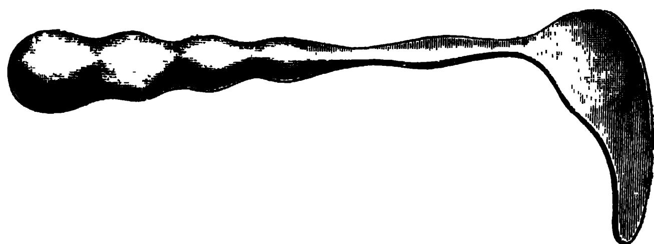


FIG. 216.—LARGE RETRACTOR OF MARTIN, TO PROTECT THE BLADDER.

anterior colporrhaphy at the same time, the incision is carried elliptically at either side, so as to remove an oval portion of the mucous membrane.) This is then reflected up with a few strokes of a knife, and the sub-mucous tissue is cautiously divided, the greater part of the remainder of this step of the operation being effected with finger, scissors, or knife-handle, or cautious dissection with scalpel. The retractor is carefully used to protect the bladder

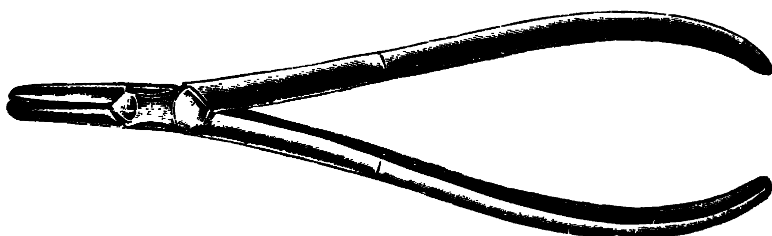


FIG. 217.—MARTIN'S NEEDLE-HOLDER.

and keep it out of harm's way. When the peritoneum is reached and divided with scissors, the retractor is slipped underneath, the uterus is seized higher up, and gradually overturned and brought into the vagina. Then the ovary and tube at either side are sought for, seized, brought into view, and examined. If healthy, they are returned, or the ovary, if follicular, may first be stabbed in several places with the point of a knife; otherwise the affected adnexa are

resected or removed *in toto*. The uterus having been returned, the gut sutures are carried through the lips of the vaginal incision, and made to include the uterine wall in continuous fashion. The peritoneum is now closed, and likewise the vaginal opening, with continuous sutures. Of course, if simple colpotomy alone be performed, the uterus and appendages are returned, and only sufficient interference is resorted to as the occasion demands. The operation in the majority of cases where the womb is not fixed by adhesions, or the adnexa considerably diseased, can be rapidly performed, the great point being that the bladder should be drawn well up out of reach, and carefully guarded by the retractor. Amputation of the neck of the uterus can be combined with this procedure, the posterior lip being first removed, and the flap sutured with gut, the anterior being left until the vagina has been closed, when it is also removed, and the flap similarly sutured with gut. I have seen Professor Martin, on the same patient and at the same time, perform colpotomy, salpingo-oöphorectomy, vagino-fixation, amputation of the cervix, anterior lateral and posterior colporrhaphy.*

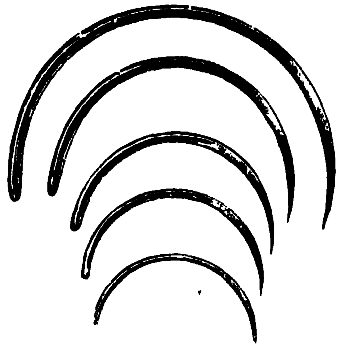


FIG. 218.—VARIOUS-SIZED CURVED HYSTERECTOMY NEEDLES. (A. Martin's patterns.)

Vineberg's Operation—Traction through the Round and Broad Ligaments.

Vineberg performed the first operation associated with his name in February, 1896. He adopted Olshausen's method to cases of vaginal fixation. The principle consists in making traction on the uterus by means of the round and broad ligaments, and not on the uterine wall, thus leaving the uterus free to enlarge during pregnancy. The following is the technique of the operation:—The patient is prepared as if for vaginal hysterectomy. The cervix is drawn by a vulsellum downward and outward to the vulva. Another vulsellum catches the anterior vaginal wall near the urethral opening

* See chapter on Vaginal Hysterectomy for other instruments, as scissors and retractors, etc., required in colpotomy; also the operation of cœlio-salpingo-oöphorectomy for a complete description of anterior colpotomy

and is held upward. In this manner the anterior vaginal wall is put upon the stretch. A longitudinal incision is now made extending from the mound just behind the urethral meatus to the vaginal attachment of the cervix. The two flaps thus formed are separated from the underlying bladder. They should be separated freely, and then the utero-vesical pouch of peritoneum is opened. The opening between the bladder and the uterus should be dilated as much as possible. The bladder is held out of the way by an anterior vaginal retractor. The anterior wall of the uterus is exposed and a silk traction suture should be passed, by which the uterus can be pulled down into the incision. If the adnexa must be examined it can be delivered by hooking two fingers over the fundus and drawing it forwards. In cases where it need not be delivered, where visual inspection of the adnexa is unnecessary, the two fingers are hooked behind one horn of the uterus and the corresponding tube and round ligament are drawn well into the incision. A suture of silkworm gut is carried behind the round ligament about three or four centimetres from its insertion into the uterus. It is passed from above down and is made to catch a portion of the tissue immediately beneath the ligament. A second one may be passed nearer to the uterus. The same is done on the opposite side. These round ligament sutures on each side are then carried through the vaginal flap, at a point corresponding to the lateral sulcus, as near the pubic arch as possible. They are tied loosely while the uterus is held forward by the traction suture. The peritoneum is closed by continuous catgut suture and the vaginal flaps are brought together, previous to which the traction suture has been removed. It may be necessary in some cases to apply an additional uterine fixation suture—which Vineberg does not think could bring about an extensive and firm union of the fundus with the vagina, especially when it is applied midway between the os internum and the fundus. In 9 of his 15 cases conservative operations on the adnexa were performed. In two cases pregnancy ran a perfectly natural course.

VENTRO-FIXATION.

The two operations that I perform for the suspension of the uterus vary only in the portion of the abdominal parietes to which the uterus is attached. In one class of case in which there is a probability or possibility of future pregnancy, I adopt Howard Kelly's method of suspension of the uterus, fixing it to the

peritoneum and sub-peritoneal fascia. In the second, the uterus is fixed to the fascia and rectus muscle in addition. This operation I reserve for those cases in which pregnancy is not possible. The operation therefore varies only in the depth and the tissues through which the ligatures are passed.

Operation.—The usual aseptic precautions having been taken, and the mons veneris carefully shaved, an incision from two and a half to three inches in length is made. The peritoneum having been opened, two fingers of the left hand are carried well down behind the uterus, and its position and mobility determined. It is now raised by the fingers, and brought forward, in which manœuvre there is generally very little difficulty. The summit of the fundus is now lightly caught in a single tenaculum, and held by an assistant. The adnexa are then examined, those of either side being brought up, and the puncturing of cysts, their resection or extirpation, determined upon, that is, in those cases in which the adnexa are diseased. A gut suture is now passed (the uterus being held well forward in extreme anteversion) through the sub-peritoneal fascia and peritoneum, with a curved needle. It is next carried through the posterior wall of the uterus about an inch beneath its summit, brought out, and is now made to pierce the corresponding structures in the opposite side of the abdominal wall. Another suture, of fairly strong silk, is carried through the anterior surface of the fundus a short distance from the summit; and a third, of gut, is passed an inch beneath the latter. The parts having been thoroughly cleansed and dried, these sutures are the last brought together, the abdominal wound being closed in the usual manner.

On the other hand, if the fixation is to be made through the muscle and fascia, I proceed as follows:—The uterus having been brought forward as I have said, the first suture of gut is passed through the sheath of the rectus, the muscle, sub-peritoneal fascia, and peritoneum, and carried in the manner I have just described, and in the same position, through the uterus, and the second and third through the same structures and in identical positions. These sutures, clipped together with catch forceps, are allowed to remain loose. The peritoneum is now closed by fine interrupted sutures of silk; the margins of the fascia and muscle are next carefully brought together and united in the middle line. The three original sutures are now tied; and, finally, the skin is closed with silkworm-gut.

*Howard Kelly's Method for Suspension of the Uterus.**

Kelly lays down as the indications for suspension the existence of a retroflexion which cannot be corrected, and where the symptoms cannot be relieved by non-operative treatment; patients who have periodical relapses, never feeling quite well, or where there are menstrual symptoms and various general disturbances. Further, he says: 'In a woman who is persistently neurasthenic, or in one who after repeated building-up efforts persistently falls back into a morbid nervous state, where there is a retroflexion or retroposition, with definite pelvic disturbances becoming more marked at the menstrual period, I would without hesitation urge suspension.'

He uses a uterine elevator of the kind shown in Fig. 220. He thus describes the steps of the operation:—

'1. After due preparation, emptying the bladder, and anæsthesia, the abdomen is slightly elevated, and an incision 3 to 5 cm. long is made down into the abdominal cavity, beginning about 2 cm. above the symphysis.

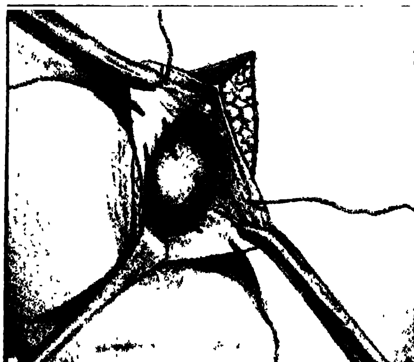


FIG. 219.—LIGATURES PASSED THROUGH PERITONEUM AND UTERUS. (Howard Kelly.)

'2. The peritoneum is then caught with artery forceps on each side, and drawn out. This is to prevent the pulling in of the peritoneum by the suspensory sutures and so leaving none to close the incision.

'3. The retroflexed uterus is then hooked up and lifted into anteflexion by means of two fingers carried into the wound.

'4. One side of the incision is then elevated with two fingers, and the peritoneum and subperitoneal fascia caught with a curved needle carrying the suspensory silk ligatures. The amount of tissue embraced is about one-third of an inch wide and one-eighth of an inch in depth.

'5. The same ligature is then conducted through the uterus on its posterior face below the fundus, and carried through the peritoneum and subperitoneal fascia of the opposite side. This suture is now tied; care being taken that no omentum is included before doing so. A second suture is now carried through peritoneum and subperitoneal fascia above the first; but it is brought through the uterine tissue just below it on its posterior surface. When this suture is tied it increases the anteflexion.

* *Journal American Medical Association*, Dec. 21, 1895.

'6. The sides and front of the uterus are then examined to see that no intestine is caught, and the omentum is drawn down.

'7. The abdomen is closed. I do this by taking off the forceps and sewing up first the peritoneum with the finest silk, and then drawing together the



FIG. 220.—ELEVATOR WHICH SERVES TO HOLD THE UTERUS UP WHILE FIRST STITCH IS BEING PASSED.*

fascia with one or two silver-wire mattress sutures, finally closing the skin with a subcuticular suture of fine silk.

'The patient may rise sooner, but I find it better to keep her quiet from

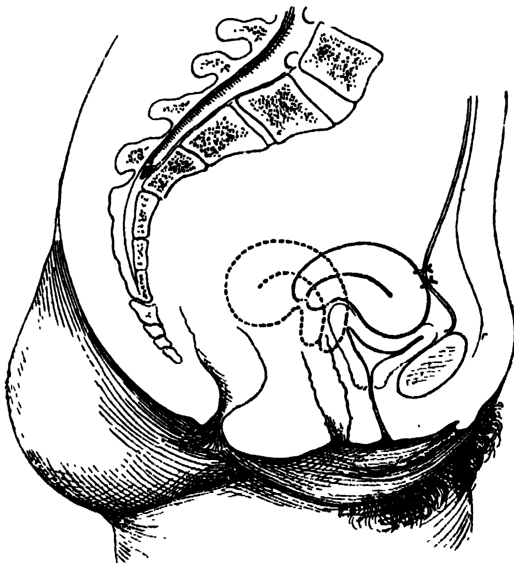


FIG. 221.—UTERUS FIXED. (Howard Kelly.)

two to three weeks. It is not necessary to wear an abdominal bandage, and I never put in a pessary afterwards.

'The failures of the operation are not more than 1 per cent. If the tubes or ovaries are diseased they are removed.'

* This is not the latest pattern of Kelly's elevator. He now uses a cupped end, similar to that illustrated in my combination of sound with elevator.

Operation of Hysterorrhaphy.

This operation was originally performed by Kelly, Sänger, Lee, and others for bad cases of retroversion and prolapse not amenable to Alexander's opera-

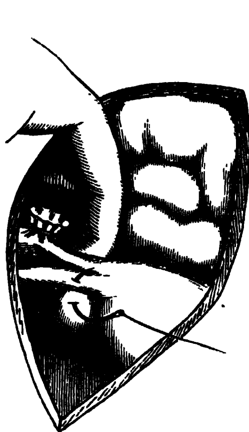


FIG. 222.—PASSAGE OF SUSPENSORY SUTURE THROUGH ROUND LIGAMENT IN HYSTERORRHAPHY. (Howard Kelly.) — *American Journal of Medical Science.*

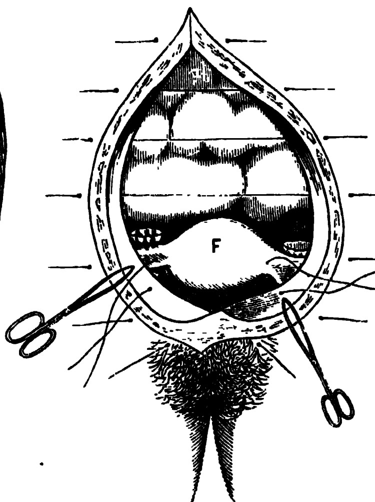
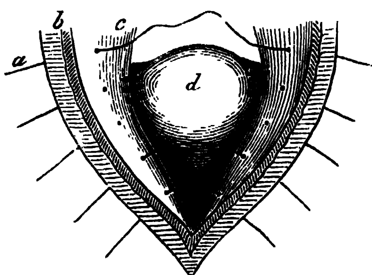
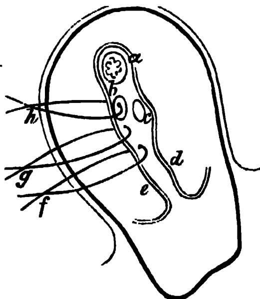


FIG. 223.—SUTURING THE ROUND LIGAMENTS TO THE ABDOMINAL WALL IN HYSTERORRHAPHY. Artery forceps everting peritoneum. (Howard Kelly.)—*Ibid.*





FIGS. 224 AND 225.—OPERATION OF OLSHAUSEN AND SÄNGER, SHOWING THE POSITION OF THE SUTURES AND THE SCHEME OF APPLICATION OF SAME. (Taken from Bonnet and Petit.)

tion; for example, those cases complicated by adhesions. It is not an operation that I either recommend or perform. The steps of the operation as performed by Kelly were—

1. Cœliotomy—fairly free incision.
2. Suturing the round ligaments so as to bring them into view; this suture is carried through the peritoneal coat of the bladder, where the uterus rests, and thus maintains the natural position of the uterus to the bladder.
3. Suturing the round ligaments quite close to the uterus, to the tissues at either side of the incision in the abdominal wall.

I. *Operation of Indirect Fixation* (Kœberlé, Klotz).

The ovary and the Fallopian tube is first removed, and the pedicle is fixed to the abdominal wall. Klotz, who has operated in thirty-eight cases, attaches much importance to the insertion of a glass tube behind the uterus into Douglas' pouch, which he withdraws after a few days. This operation has the drawback of sacrificing the ovary, of twisting the uterus, and of causing an imperfect reunion. He attributes several failures to it.

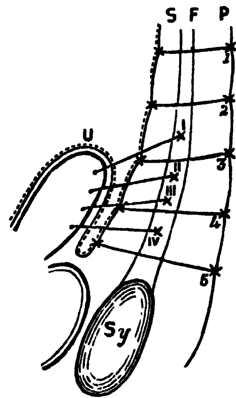


Fig. 226. — Terrier's Operation, Sectional View, showing the Insertion of the Retaining Sutures and those closing the Abdominal Wound. (Bonnet and Petit.)

II. *Operation of Direct Lateral Fixation of the Uterine Body* (Olshausen and Sänger).

The sutures are made at each side, not at the fundus, but on the borders of the uterus, by the aid of a 'crin de Florence.' Care must be taken not to include in the sutures the anterior serous layer, nor to pierce the Fallopian tube nor the epigastric artery. This operation has the disadvantage of creating a fissure or buttonhole between the uterus and the abdominal wall, which may cause internal strangulation.

III. *Operation of Direct Mesial Fixation of the Uterine Body* (Leopold, Czerny, etc.).

Leopold fixes the fundus of the uterus to the abdominal wall. The uterus is replaced after the rupture of its adhesions. A strong needle filled with silk thread is passed from before backwards a short distance from the margin of the abdominal wound, and level with the fundus uteri. The uterine tissue is penetrated in the anterior portion of the uterine wall at the line joining the insertion of the round ligaments.

The needle passes under the serous membrane and the superficial bed of muscular tissue to an extent of 1 centimetre; it is then carried from behind forwards through the abdominal wall under the other margin of the wound. He places a second suture above the first, over the transverse line which marks the insertion of the tubes, and a third a little above the second, in the same manner. To render the adhesions more secure at this level, Leopold lightly scratches, with the back of a bistoury, the surface of the peritoneal

covering of the uterus in the space which surrounds the stitches, so as to make a superficial and non-sanguineous abrasion which simply removes the epithelium. Then, when he reunites the lips of the abdominal wound at this level, he compresses and knots these three sutures over the abdominal wound, so that the anterior surface of the uterus is applied exactly to the parietal peritoneum. He then proceeds to close the rest of the wound. The sutures are taken out at the end of twelve or thirteen days. In abstaining from buried stitches, Leopold thinks that he brings about firmer and tighter adhesions, less serrated, and less troublesome for the bladder.

Leopold adjusts a Hodge's pessary for a month, to assist the stitches in maintaining the good position acquired.

Czerny pierces the anterior wall of the fundus with a strong needle armed with sublimate gut. The needle first traverses the aponeurosis and the peritoneum on each side, but does not include the integuments. Two stitches are thus placed, care being taken not to make traction on the uterus. The ligatures are then tied, the ends cut, and the abdominal wall is sutured.

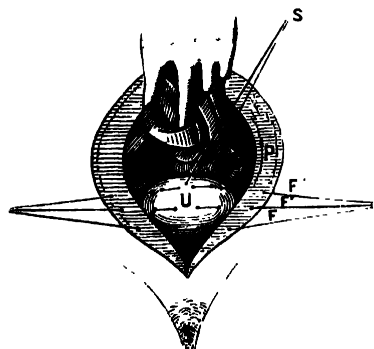


FIG. 227. TERRIER'S OPERATION, SHOWING THE SILK THREAD INSERTED INTO THE FUNDUS TO DRAW THE UTERUS FORWARD AND RETAIN IT DURING THE OPERATION. (From same.)

Terrier begins the operation by passing a thread of silk through the summit of the fundus of the uterus, by means of which it is drawn forwards with three gut sutures. The anterior wall of the uterus is fixed; the sutures pass through the entire thickness of the abdominal wall with the exception of the subcutaneous tissue and skin. Great care is taken in the way the sutures are passed through the uterine tissues, so that they are hidden by the anterior wall of the uterus and the abdominal parietes. Adhesion, he thinks, is thus better secured. A small drainage-tube is placed in the interior of the wound when it is closed.

Pozzi divides his operation into four stages:—

1. Incision of the abdominal wall, in the middle line, for a distance of 8 centimetres.

2. The fundus of the uterus is brought forward by the index and middle fingers of the right hand, this proceeding being assisted by the introduction of the left forefinger into the vagina if required.

3. The fundus of the uterus is caught in the middle line by a forceps, and held forward by an assistant. A Hagedorn's needle is armed with strong silk, and carried through the lower end of the wound, embracing in its passage the whole plane of the abdominal walls, with the exception of the skin and subcutaneous fat at either side; the same thread is brought in a spiral manner from below upwards, including in its course all the deeper layers of the abdominal

wound, together with the superficial bed of the anterior wall of the uterus in the middle line, three turns of these spiral sutures being sufficient to fix the uterus.

4. The remainder of the wound is closed by two superimposed sutures of catgut, and the skin and cellular tissue are adapted by two silken threads.

Statistics of Ventro- and Vaginal Fixation, and the Influence of these Procedures on Pregnancy and Labour.

Hohl argues that only cases of retroflexion and of prolapse should be treated by operation in which pessaries and other treatment have failed. Practically, Martin's operation of vaginal fixation is the one to be preferred when the retroflexion is combined with inflammatory affections of the adnexa or adnexal tumours. If there be prolapse, colpotomy is combined with colporrhaphy. When larger tumours of the adnexa are present, and more severe prolapse, ventro-fixation is the best operation.*

Boralevi,† from a number of statistics which he collected, showing the ill results which followed after the operation of fixation by various surgeons, states that only in six cases out of seventy-four in which pregnancy followed did abortion occur, and that the pregnancies going to term after ventro-fixation might be put down at 90 per cent., operative interference being required in only fourteen cases out of all the operations so far performed. He comes to the following conclusion in favour of ventro-fixation as the operation *par excellence* when there is a prospect of pregnancy occurring :—

(1) In mobile retroflexions which have not been treated successfully by pessaries or Alexander's operation, and in all cases of fixed retroflexion which require surgical interference, ventro-fixation is indicated, because (*a*) under present surgical conditions it is not dangerous; (*b*) it replaces the uterus in its physiological position; (*c*) relapse is rare if care be taken; (*d*) the bladder is seldom incommoded; (*e*) conception is facilitated; (*f*) it allows pregnancy to go to term; (*g*) it does not lead to complications during labour.

(2) Vaginal fixation is advised against because (*a*) relapses are more frequent after it than after ventro-fixation; (*b*) it places the uterus in pathological anteflexion; (*c*) vesical disturbances are frequent; (*d*) it hinders conception; (*e*) it leads to frequent abortion; (*f*) it may expose the woman to grave dangers during labour.

From exhaustive researches made in 1896 by Luigi Negri ‡ into the effects of the following methods on pregnancy and labour, (*a*) direct and indirect ventro-fixation, (*b*) intra-peritoneal vaginal fixation, (*c*) trans-peritoneal vaginal fixation, and other procedures, certain conclusions may be drawn. The operations of Dührssen, Martin, Mackenrodt, Baudoin, Sänger. Strassman, and a number of other authorities, are analyzed. In a proportion of cases of vaginal fixation sterility follows, through the kink produced in the Fallopian tubes. On the other hand, sterility has been frequently cured by both

---

* *Archiv. fur Gynakologie*, 1897.

† *Annali di Obstetricia e Ginecologia*, Sept., 1897.

‡ *Annali di Ostet. Gen.*, 1896.

vaginal and ventro-fixations, pregnancy occurring in some 30 per cent. of those operated upon. Adhesions are present after a considerable interval of time following both operations. Relapse is more frequent after the vaginal operation than the abdominal. Cuzzi, Sänger, Demelin, and Strassman prove that distension and stretching of the adhesions occurred during pregnancy, and that involution takes place after labour, an increase which follows more readily in vaginal fixation (sero-serous) than in ventro-fixation (sero-fibrous). Several authorities have described cords and bands running from the ventral wound to the uterus (Howard Kelly has figured several of these in his recent work). In the instances of 115 women operated upon by ventro-fixation, there were 71 labours at term; out of 102 in which the result of the operation was traced, there were 10 abortions, and 2 premature births due to the operation. There were 5 anomalous presentations, and 3 Cæsarian sections. In 14 of the 115 pregnancies there were disturbances, such as pains and dragging at the seat of the wound.

Statistics prove that there is no advantage as regards the effect on pregnancy and labour of the extra-peritoneal over the intra-peritoneal vaginal fixation.

Turning now to vaginal fixation, there were 112 pregnancies in 99 women, and the result was recorded in 77. Of the latter, 19 aborted, there were 6 anomalous presentations, and 49 terminated naturally. There were three Cæsarian operations. In vaginal fixation there is a greater risk of pressure on the pelvic viscera during pregnancy, especially on the ureter, this possibly resulting in eclampsia. The comparison between ventro-fixation and vaginal fixation gives a relative percentage of interruption of pregnancy in 7 per cent. of the former, and 15 of the latter, whereas the interruption due to untreated retroflexion is placed (Bamberger and Weberstadt) at from 20 to 30 per cent., and 12 per cent. with the use of a pessary. Alexander's operation has attributed to it only 4 per cent. of interruptions. The following are the points to attend to in a pregnant woman who has had hysteropexy performed:—

1. In a multipara who has had normal pregnancies, and in whom interference with the course of the pregnancy is threatened, the adhesions should be broken down bi-manually.

2. Ordinary interferences with the progress of labour are dealt with in the usual manner, and extra care and precautions must be taken if any graver conditions are present, as, for example, non-dilatation of a drawn-up cervix by protection of the membranes, dilatation of the vagina, retraction of the cervix, and dilatation of the os uteri. Should the anterior wall of the uterus prevent delivery, there is a question of division of the cervix or Cæsarian section.

Lapthorne Smith, who has had a large experience in ventro-fixation and Alexander's operation, reported in the American *Journal of Obstetrics* in 1898, that of 148 cases, the statistics of which were collected by him throughout America, in 30 per cent. there was trouble at the confinement due to ventro-fixation. He arrived at the following conclusions from his own cases, as well as from the statistics of others:—(*a*) The most reliable results are obtained with two buried silk stitches through the peritoneum and fascia. (*b*) Ventro-fixation should be reserved for cases in which there is present an affection of the adnexa and adhesions in addition to the displacement. (*c*) In simple suspensio-uteri relapses are more frequent, but there are fewer complications with labour. (*d*) Intra-abdominal shortening of the round ligaments, by drawing a loop of the round ligament into the loop which ties off the ovary and tube, if these be removed, is preferred by some. When the adnexa are not removed, the round ligament is shortened by drawing up a loop of it and stitching it to itself for a space of about two inches. As pregnancy advances the accidents of ventro-fixation are avoided. (*e*) Alexander's operation should be preferred when the uterus and appendages are free from adhesions, as this operation does not interfere with pregnancy. Also, it may be well in certain cases to combine the freeing of adhesions by a small median incision with Alexander's operation.

Charles Noble, having collected evidence of the relation of suspensio-uteri to pregnancy, says that it has little or no influence on abortion, though if there be very acute anteflexion of the fundus, the imprisonment of the child at the time of labour may call for a Porro-Cæsarean operation. Cases of pregnancy following this operation should be examined from time to time, and especially about the seventh and eighth months, and if the cervix be found drawn up out of the pelvis, and especially if the condition above noted can be made out, labour should be induced from four to six weeks before full time. Despite his successes and those of others quoted by him, he proposes in these cases to adopt for the present shortening of the round ligaments.*

Sinclair of Manchester is a warm advocate for ventro-fixation, and in his hands no distress has been experienced when pregnancy has followed the operation, and bladder troubles are quite the exception, while ventral hernia has been an occasional consequence.

---

* *Amer. Gynæ. Jour.*

CHAPTER XII.

UTERINE DISPLACEMENTS (continued).

PROLAPSUS.

By prolapse of the uterus we mean a descent of the uterus in the pelvis; this descent is attended by relaxation of the vaginal walls, prolapse, and frequently inversion of the vagina itself. The bladder is involved according to the degree of the prolapsus. If the uterus pass outside the vulva, we may have an accompanying cystocele or rectocele, both bladder and rectum being dragged on by the descending uterus and vagina. The prolapse is generally divided into three stages: in the first the uterus lies entirely within the vulva; in the second it makes its appearance outside the vulva; in the third it is protruded entirely outside the vulva orifice. The two latter stages are also styled 'procidentia.' The influence exerted by the vagina and perinæum in supporting the uterus in the pelvis has been already referred to, as well as the part taken by the utero-sacral and other pelvic ligaments in the suspension of the uterus from above. Three pathological conditions we find associated with, and contributing to, prolapse: relaxation of the pelvic ligaments, atonicity of the vaginal walls, and weakened or absent perinæum. But further descent of the uterus necessarily means version. As the heavy uterus descends, the fundus yields to the abdominal pressure, and is directed or forced backwards, and thus a state of retroversion ensues.*



Fig. 228.—Showing Gradual Descent of Uterus. (Thomas.)

The displacement, on the other hand, may commence with retroversion or anteversion of the uterus—commonly the former; or the descent of the womb may be consequent upon a positively prolapsed condition of the vagina. It is rare to see a well-marked

* See p. 302 for relaxed vaginal outlet (Kelly).

case of prolapse of the uterus where there is not accompanying vaginal prolapse, which, in the great majority of instances, has, I believe, occurred synchronously with the uterine descent, the causes which operate in producing the one displacement at the same time tending to induce the other. It is frequently difficult to say whether these causes have first taken effect on the vagina or uterus. The uterus descends in the vaginal axis, and gradual inversion of the vagina accompanies its downward progress. The entire organ becomes congested, and, as a consequence, there is hypertrophy both of the supra- and infra-vaginal portions. But this is generally greater in the infra-vaginal portion of the cervix,

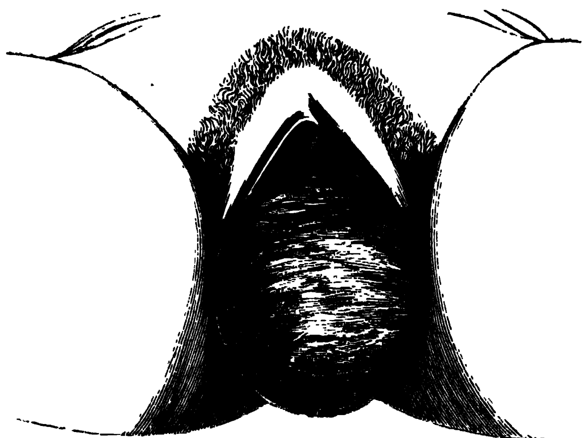


FIG. 229.—PROLAPSE COMPLICATED WITH CYSTOCELE.* (Author.)

which is seen thickened and elongated. This hypertrophic condition of the cervix, both supra- and infra-vaginal, is an important factor amongst the causes producing complete prolapse.

If we thus take, in their sequence, the usual pathological events which operate during the occurrence and completion of the prolapsus or procidentia, they would be much as follows: (1) Relaxation of, or deficiency in, the uterine supports; (2) retroversion of the uterus; (3) descent of the uterus; (4) partial prolapse of the vagina; (5) incipient inversion of the vagina; (6) incomplete prolapse of the uterus, with descent of the bladder, and possibly of the rectum; (7) during the occurrence of the processes 4, 5, 6,

* This procident sac was reported upon by me many years since. The conditions corresponded exactly to the section seen in Fig. 230 and in Plate VIII., p. 298.—Case I. (*vide* diagram).

enlargement of the uterus, with hypertrophy of the supra- and infra-vaginal portions of the cervix, and eversion of the lips of the os uteri; (8) further inversion of the vagina, with protrusion of its anterior wall, and thickening of the mucous membrane, which gradually becomes hard and may be eroded in parts; (9) complete prolapse of the entire uterus and inverted vagina, both being altered by exposure and friction.

Causation.—The common predisposing causes are: Pregnancy; deficient or absent perinæum; laceration of the cervix; uterine

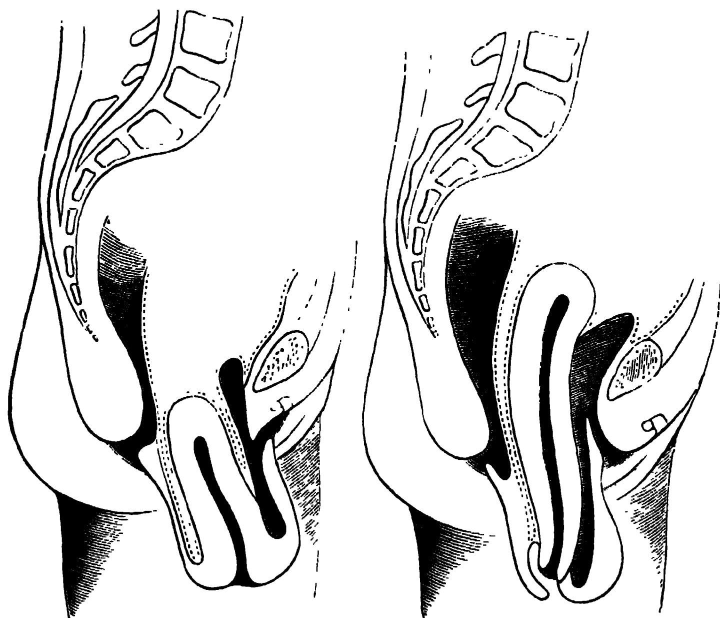


FIG. 230.—PROLAPSUS WITH CYSTOCELE. (After Schroeder.)

FIG. 231.—HYPERTROPHIC ELONGATION OF CERVIX. (Schroeder.)

These drawings are placed side by side so that the two conditions, prolapsus and hypertrophy, may be compared. See Plates VIII. and IX., p. 298, and the diagrammatic representations of the sections of the procident sacs.

tumours, abdominal tumours; uterine hyperplasia; imprudent clothing; advancing age; 'too roomy' pelvis; constant standing, and raising heavy weights; accident or shock; severe labour, in which instrumental delivery has been necessary. In older women who have borne many children we occasionally find all the pelvic supports weakened, the ligaments enlarged, the vagina having a

tendency to prolapse, the perinæum deficient in vital tone, and the sphincter-vaginal muscles also enfeebled.*

Laceration of the cervix, as a consequence of labour, has as frequent attendants an enlarged uterus, a relaxed outlet, and a deficient perinæum. Both uterine tumours and uterine hyperplasia cause increase of weight of the uterus, and so tend to prolapse. Pressure directed on the uterus from above, either from some abdominal tumour, or from the more common sources, tight clothing and heavy garments, pushes it downwards and induces prolapse. Great exertion, necessitating fixation of the diaphragm and straining efforts of the abdominal muscles, when continued for a length of time in some laborious occupation, causes general weakness of the pelvic ligaments and a sinking of the uterus. This, with the secondary changes occurring in the uterus itself, is the cause of the descent.

During some violent efforts, as in epileptic convulsions, while straining at stool, or in a severe fit of coughing, the uterus may descend and be prolapsed. Such an accident is attended by great pain, symptoms of shock, and possibly those of internal hæmorrhage. As a rule, there has been some antecedent condition, as one of those causes mentioned. A reference will be found at p. 302 to *relaxed vaginal outlet*, as described by Howard Kelly.

It is well to remember that pregnancy has occurred in cases of prolapse, and so has tubal fœtation. As pointed out below, a submucous fibroid, an intra-uterine polypus, or diseased states of the adnexa may be present.

Symptoms.—Pain is felt of a 'dragging' and 'bearing-down' nature—mostly in the back and loins, aggravated by standing or walking. The patient occasionally complains of a sensation as if 'something were coming down,' when at stool. In the earlier stages the symptoms of retroversion are present; later on, when the bladder and rectum participate in the displacement, vesical and rectal distress follow; such distress is felt in rectal irritation, tenesmus, sense of pressure, occasional difficulty in defæcation, ending, when there is complete prolapse, in cystocele or rectocele. The congestion which accompanies the prolapse is the cause often of menorrhagia or metrorrhagia. In extreme cases the epithelial

* An interesting paper on 'A Case of Prolapse of the Cervical Zone of the Uterus, preceding Labour, at Full Term,' was read at the Royal Academy of Medicine, by H. W. Kidd, of the Coombe Hospital. In this paper he gives a complete *résumé* of the records of cases of prolapse of the *pregnant* uterus.—*Dublin Monthly Journal of Medical Science*, December, 1889.

surface of the procident mass—at first thickened and rough—may inflame and ulcerate, and these ulcerations may scale over and occasionally bleed. The irritation from the urine still further increases such ulcerations. I have seen a large gangrenous slough on the surface of a procident uterus. This may be the result of strangulation of the mass at the vulvar opening.

Polypus complicating Prolapse.—A lady, over sixty, consulted me for complete prolapse of the womb and a foul discharge, which had continued for some time. On examination, I saw one of these foul ulcerations, in size about the circumference of a penny; and issuing from the hardened and everted os uteri was a most fetid and dirty-coloured discharge. I feared malignant disease of the uterus. I dilated the canal, and found, growing from the upper part of the elongated cervical portion, a small polypus, which I removed. The interior of the uterus I treated with nitric acid—this I repeated; to the external ulceration I also applied nitric acid, and subsequently chromic acid. Gradually this latter healed, and the discharge finally disappeared. The patient, before I saw her, had tried a variety of supports, and had given each up in turn from its inability to sustain the uterus. Ultimately I returned the prolapsed womb, and retained it comfortably in position with a Zwanck's pessary, for which she was prepared by the previous use of oakum. In such a case I would now operate by amputation of the cervix, curettage, and ventro-fixation.

Diagnosis.—In the earlier stages of prolapsus the os uteri is lower than usual, and the body of the womb deeper in the pelvis. It may be that the uterus is anteflexed, or that there has been an antecedent retroversion. Even in this early stage we may detect a prolapsed state of the vagina and a flaccid condition of the anterior vaginal wall. If the uterus have descended for any distance, if it present at the vulva, or be outside of it, the least care will prevent any error of diagnosis. It is better to examine the patient standing, when we desire to estimate the degree to which the uterus has descended. It is well always to take the measurement of the uterine cavity with the sound. This is necessary, not alone to determine the position of the uterus, but also to differentiate true prolapse of the uterus from either prolapse complicated with hypertrophic elongation of the cervix, or the same abnormality when it occurs alone.

In ordinary prolapse the sound may pass a little further than natural into the uterus, or the canal may be normal in length; while if there be hypertrophic elongation of the cervix, the sound passes a considerable distance, and we thus prove that the uterine cavity is enlarged, while by palpation we feel the fundus in its proper position. If we pass the uterine sound into the prolapsed

uterus, while in the state of procidentia, it may enter to the extent of some three or more inches. When the strain is removed from the relaxed tissues by reposition, it will be found to pass to about the usual length. With any exercise of caution, no one can mistake a case of procidentia for polypus or inversion of the womb. (See 'Hypertrophic Elongation of Cervix.')

Treatment.—We may divide the treatment of prolapsus thus: (1) prophylactic; (2) replacement; (3) retention; (4) operation. Under the first class we include those general constitutional and local measures which tend to reduce the size and weight of the uterus. With this object we enjoin such an amount of rest in bed, or on a couch, as the patient's circumstances will permit. Unfortunately, many cases of prolapse are met with in women who have to work for their living, and who cannot afford to lie down. In the earlier stages, when we recognize the displacement, there should be free use of the vaginal douche, with astringent washes, such as those of alum, tannin, or sulphate of zinc, or tampons of salicylic acid wool and glycerine. The powder, being added to the tampon in various proportions, can be introduced by the patient at bedtime, and worn during the night. When the vagina is tamponned by the surgeon, the patient should be placed in the knee-elbow posture. Tight-lacing must be prohibited, and the undergarments suspended from the shoulders, and not from the hip. The patient may be made to wear a properly adjusted abdominal support or belt. This should fit accurately, raising and supporting the intestines above the pubes.

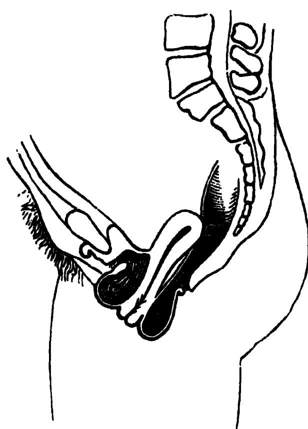


FIG 232.—RUPTURED PERINÆUM, RECTOCELE, AND CYSTOCELE WITH ELONGATION OF CERVIX, SIMULATING PROLAPSUS. (After Martin.)

Any abdominal support should be fitted accurately on the patient by the maker, and be made to properly-taken measurements. Many belts are quite useless; they slip up on the waist and do not support the uterus. A silk-elastic support, especially made like a weft Nightingale cholera belt, is very comfortable, and will be found useful in many cases where our object is to keep the abdomen warm. They can also be had in Jaeger's flannel.

Regular cold bathing, and especially sea-bathing, when such can

be had or borne, is of service. At the same time, any constitutional or local condition which either promotes congestion of the uterus or favours relaxation of its supports, must be attended to. Occasional depletion of the cervix; the administration (during the menopause especially) of such tonics as strychnine and the mineral acids, quinine and arsenic; careful attention to the bowels, so as to prevent all straining at stool, by the occasional use of a cold-water enema or a saline water given in the morning, and the correction of any version or flexion of the womb, are some of the simplest and most efficacious measures we can adopt.

It is of special importance to attend to any chronic cough, and to allay laryngeal and lung irritation. If the prolapse should have

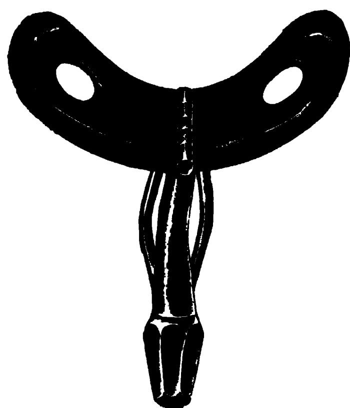


FIG. 233.—ZWANCK'S VULCANITE PESSARY (open).*

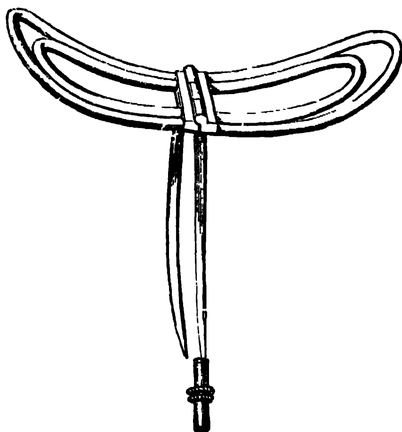


FIG. 234.—GODSON'S MODIFICATION OF ZWANCK (open).

lasted for some time, and the uterus be descending low in the vagina, or protruding from the vulva, we have to replace it.

To replace the procident mass, we get the patient into the knee-elbow position, and, grasping the base of the tumour, we follow the advice insisted on by McClintock in all such cases, and return that portion last which protruded first. The uterus can, if necessary, be prepared for the use of a pessary, and those means already detailed should be employed to contract the vagina and reduce uterine congestion.

To retain the uterus in position we have recourse to pessaries. We may classify the pessaries useful in prolapse under these heads :—

* The pessary is introduced with the wings closed; by turning the screw in the handle these diverge to the required extent.

(*a*) Those useful in incipient descent, complicated with retroversion or anteflexion.

(*b*) Those applicable in incomplete prolapse of the uterus, with partial prolapse of the vagina.

(*c*) Those suitable for complete prolapse of the uterus, with inversion of the vagina and loss of contractility of the vaginal walls.

For class (*a*) the best pessary we can employ is the ordinary Hodge. We may select any of the materials we prefer—vulcanite, celluloid, or wire with rubber covering. I prefer the celluloid, as it is the easiest moulded to the shape and size we require. We must adapt it according as the uterus is retroverted or anteflexed.

In class (*b*) Hodge's pessary will also be found to answer in a

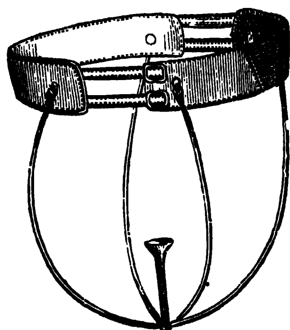


FIG. 235.—NAPIER'S PROLAPSE PESSARY.

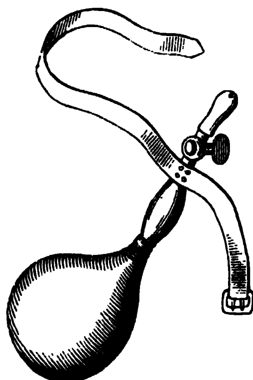


FIG. 236.—BRAUN'S COLPEURYNTER.

large number of cases. Here the pessary should be well cupped, large enough to retain its position, but not of such a size as to forcibly distend the vagina. All pessaries should be periodically removed and cleansed, and during their use, vaginal deodorant and antiseptic injections should be occasionally employed. If a Hodge's pessary, or some modification of it, should not rectify the prolapse, we may try the rubber glycerine ring (Fig. 212). The glycerine ring is by far the best soft ring pessary made. It has the disadvantage of requiring more frequent renewal. The ring must be of a size suitable to the case, sufficiently thick, and with a strong spring. In this degree of prolapse, also, we may have to use a Zwanck's pessary, of the vulcanite kind, or the modification of Clement-Godson's.

I find that many patients manage the vulcanite Zwanck best, and prefer it to the wire. It has the disadvantage that it is apt to accumulate discharge, and thus become unpleasant; also the screw which regulates the divergence of the wings is liable to be broken in screwing or unscrewing it. The patient is usually taught to use the pessary, and how to insert or remove it. This latter she should do *before* lying down at night, placing the pessary in a little Condy's solution. If Godson's kind be selected, it is equally easy of adjustment, and it certainly has the advantage in cleanliness and durability.

In complete prolapsus it will be found extremely difficult to sustain the uterus by any pessary. I dislike the principle of all balls and rings, and never myself use them. In some cases, material support and considerable comfort may be obtained from a carefully fitted abdominal support, to which is attached a perinæal pad like that of Palfrey.

Elongated Cervix, Complicating Prolapse of the Uterus or Vagina.— I do not intend to enter into the various matters in dispute regarding the relation of the hypertrophic elongation of the cervix uteri to prolapse of the uterus or vagina. I shall simply limit any observations to such practical points in the etiology and diagnosis of the affection as are requisite for every student and practitioner to know. The following facts, which are now generally accepted, have a practical bearing on the management of this condition:—

1. The cervix uteri may be hypertrophied and lengthened out either in its infra-vaginal or supra-vaginal portions. Whether this elongation be a primary growth (Huguier), independent of any dragging action of the prolapsing vagina and bladder, or a consequence of this latter, is a matter of dispute. Taylor considers that it is the result of non-involution of the uterus after labour, when the uneffaced infra-vaginal cervix drags on the non-glandular isthmus and draws it out. He does not believe in the commonly accepted doctrine of the effacement of the glandular cervix during pregnancy, and is of opinion that it is simply hypertrophied and temporarily expanded.

2. Elongation of the infra-vaginal portion of the cervix is not, as a rule, attended with prolapse. The fundus remains at its proper level in the pelvis, nor does the os descend so far as to protrude. There is a peculiar elongation of the anterior lip accompanying this condition, known as 'tapiroid.'

3. Hypertrophic elongation of the supra-vaginal portion is, sooner or later, associated with prolapse and procidentia of the uterus and bladder. There are here two principal factors—growth and traction: which is the initial process we will not attempt to say. It would

seem rational that each has an independent share in the early stages of the distortion. It is difficult to define the exact spot where the 'vicious circle,' as Goodell aptly termed it, commences.

4. Eversion of the lips of the os uteri, with exposure of the cervical canal, and laceration of the cervix, are common attendants on this form of prolapse of the womb.

Causation.—The most frequent causes of hypertrophic elongation of the cervix are: faulty involution of the uterus after labour; injury to the cervix during labour, and laceration of the cervix (in these two latter conditions we find the two associated states which usually produce hypertrophic change, viz., hyperæmia and hyperplasia); fibroid tumours; pelvic adhesions; uterine displacements; laborious occupations.

Treatment.—Replacement and support, and similar operations to those resorted to in ordinary prolapse; amputation of the cervix by the knife, galvanic knife, galvanic wire, or écraseur. The operation of Sims I have already referred to.

I have recently operated on the most extreme case of true hypertrophic elongation of the infra-vaginal cervix I have ever seen. The patient was a nullipara, the os uteri and canal were of the conical and sterile type. The long uterine neck was completely protruded from the vulva. There was constant trouble with the bladder. I amputated the elongated cervix in the usual manner.

Surgical Procedures.—Various plastic operations are performed to remedy complete prolapsus. We may thus classify them: 1. Those operations undertaken with the object of restoring and strengthening the perinæal body; 2. Those intended to produce contraction of the vaginal canal; 3. Partial closure of the vaginal opening; 4. Amputation of the cervix; 5. Hysterectomy.

'If we ever intend,' as Gaillard Thomas insists, 'to inculcate true, rational, and reliable precepts,' we must regard the perinæal body as the triangular concavo-convex body, with its apex superiorly, composed of strong elastic connective tissue, that fills in the space between the anterior wall of the rectum posteriorly, the vaginal wall anteriorly, and the summit of the vagina above. This elastic connecting pillar is itself under the influence of, and is supported on, muscles, the tendency of whose action is to throw the perinæal pillar upwards and forwards, thus assisting in the support and closure of the vaginal canal. Together with it these muscles (1) 'sustain the anterior wall of the rectum, and prevent a prolapse of the bowel, which, did it occur, would inevitably

drag downwards the upper vaginal concavity, and with it the cervix uteri, and destroy the equilibrium of the uterus. (2) They support the posterior vaginal wall, and prevent a prolapse of this partition, which would favour rectocele. (3) Upon the posterior vaginal wall rests the anterior, and upon this the bladder, and against the bladder lies the uterus—all of which depend in great degree for support upon the entire perinæal body. (4) They preserve a proper line of projection of the contents of the bladder and rectum, and so prevent the occurrence of tenesmus, a frequent cause of pelvic displacements. Thus the entire perinæal structure may be truly said to form "the keystone of the arch" on which the uterus is supported in the pelvis.' *

Various Operative Procedures for Prolapse of the Uterus and Vagina.

1. Deferred closure of perinæum.
2. Tait's operation for laceration of the perinæum.
3. Doléris' modification of same.
4. Dührssen's operation.
5. Lateral anterior and posterior colporrhaphy.
6. Sims' operation.
7. Doléris' operation.
8. Reamy's operation.
9. Colpoperineorrhaphy (Martin's operation).
10. Amputation of the cervix (Sims' operation).
11. Schroeder's operation.
12. Martin's operation.
13. Colporrhaphy with ventro-fixation.
14. Colpo-hysteropexy (Sänger's operation).
15. Hysterectomy with colporrhaphy.

We need, then, feel no surprise that in consequence of laceration during parturition, or from atonic states due to prolonged pressure or constitutional debility, the perinæal body should no longer perform its part in the mechanism of the pelvic supports. Displacements of the uterus are amongst the consequences, and especially prolapsus. Assuredly if surgeons only recognized the ills, immediate and remote, which follow lacerated perinæum, we should less frequently hear of 'secondary operations.' The sensible obstetrician stitches the perinæum *at once* when he recognizes the laceration after parturition. The futile plan of binding the knees together were better never conceived, unless, indeed, to be adopted after the immediate operation. It encourages procrastination, and is almost certain to end in failure.

Take it all in all, I believe that there is not, in the entire range of gynæcological practice, a point more necessary to insist on than early closure of the perinæal wound after parturition. This caution pertains rather to midwifery than to gynæcology; but it has such important bearing on the future

* I have here modified the early teaching of Gaillard Thomas, in which I consider sufficient stress was not laid on the part played by the perinæal muscles in the pelvic floor.

happiness and comfort of a woman, when the labour has been long forgotten, that it warrants this stress being laid upon it.

All operative procedures on the vagina and perinæum in colporraphy, fixation operations, and perineorrhaphy, should be carried out under the most complete aseptic precautions. The hair of the vulva and about the laceration should be shaved, and the parts thoroughly washed with disinfectant soap, and finally wiped over with alcohol and ether.

Whatever operation is performed (I believe that of Lawson Tait to be one of the most perfect in principle, and not difficult of execution), the objects are to denude the edges of the rent; to expose, posteriorly, two raw vaginal surfaces for union, so as to bring the rectum forward; to restore the action of the sphincter and levator ani muscles; and to create, when necessary, a new perinæum. The steps vary according as the operation is intended merely to rectify a partial or complete rupture. In the former



FIG. 237.—ABSENT PERINÆUM WITH RETROVERSION. (After Martin.)

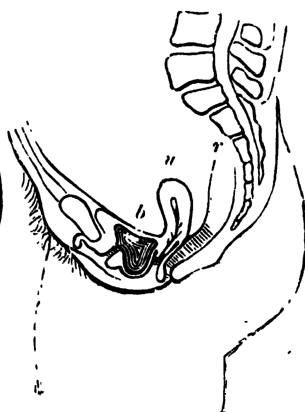


FIG. 238.—RUPTURED PERINÆUM AND CYSTOCELE. (After Martin.)

case, the operation is a comparatively trivial one, whereas in the latter we have not alone to construct a perinæal body and narrow the vagina, but also to re-establish the functions of the sphincter muscle.

Deferred Operation for Lacerated Perinæum.

*Appliances required.** — A straight scalpel; a pair of curved scissors; artery forceps, dissecting forceps, some hæmostatic forceps;

* The various needles, needle-holders, scissors, and other appliances required for all these plastic operations on the vagina and associated operations on the cervix, are all shown in the text.

perinæal needle, with the eye in the point, rectangular and curved; a few short, well-curved needles, and needle-holder; silkworm gut; silver wire; a shot-compressor; some perforated shot; a self-retaining catheter; sponge-holders. Two assistants, nurse, and anæsthetizer are always required (it is well to have a second nurse when possible). In all vaginal operations the usual aseptic precautions are taken before the patient is placed on the table, and the hair of the vulva, or that in the vicinity of the perinæal wound, is carefully shaved. Mere cutting off of the hair with scissors at the time of the operation is not sufficient. It is always right to commence the disinfection of the vagina the day before (*vide* chapter on Asepsis). The bowel also ought to be well emptied by an aperient and enema.

The patient is placed opposite a good light. The head and

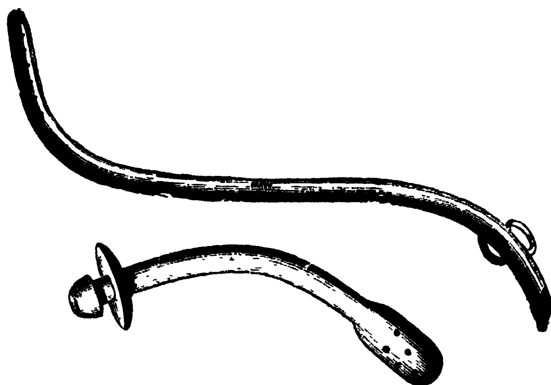


FIG. 239.—SELF-RETAINING CATHETERS. (Skene-Goodman.)

shoulders are supported with pillows. She is brought well to the edge of the table, in the lithotomy position, and each knee is held apart by an assistant, who controls it with his arm, while at the same time he stretches the labium of that side either with the free hand or with the hand of the same arm, which leaves the other at liberty to assist the operator; or leg-rests may be used, and the need for an additional assistant thus dispensed with. As the operation may be tedious, the feet and legs of the patient should be protected from the cold by domette bandages carried as far as the knees. The surgeon next introduces two fingers of the left hand into the rectum, and puts the mucous membrane on the stretch. I shall include here the steps required presuming the rent to extend as far as the anus. The operation is commenced by paring off with knife, or scissors, or both, the rectal margin

of the mucous membrane, and continuing the dissection by removal of a layer of the mucous lining of the posterior wall of the vagina to the extent of an inch and a half. The lateral margins are now attacked in a similar manner, until a triangular raw surface at either side of the labium is exposed, of about one inch in breadth, and over an inch and a half in length. Bleeding is readily controlled by hæmostatic forceps or *serres-fines*, assisted by the use of some very hot water. The raw surface at one side should be an exact counterpart of that on the other. The extent of the denudation, anteriorly and posteriorly, will depend on the extent of the laceration. He now prepares to pass the sutures. One sharply curved needle, or a properly curved short needle, held in a needle-holder, is passed, armed either with ovariotomy silk, silver wire, or silkworm gut (I prefer wire), from the lower margin of the anus and half an inch to its outer margin, deeply upwards, across the recto-vaginal septum, well in front of and above the bowel orifice, and is brought with a sweep of the needle down and out, at a corresponding point at the opposite side. This is Emmet's suture. When passed nothing should be seen of the wire save the two ends. This suture is next secured by twisting. The perinæum is now closed by sutures. The safest plan is to pass the first few sutures, unexposed, through the recto-vaginal septum. The last few passed will be partly exposed on the vaginal side of the rent. Each suture is secured by perforated shot. The wound is cleaned and sponged with carbolic solution; the thighs are brought together, the patient is placed on her back, and the urine is drawn off every six hours. *I much prefer to draw off the urine rather than trust to a retained catheter.* Unless with a very careful and experienced nurse, self-retaining catheters are dangerous; they are apt to slip out and endanger the success of the operation. The Skene-Goodman instrument is about the best. The bowels may at first be locked with opium, and simple but nourishing food given. They need not be moved until the sixth or seventh day. This is effected by an emollient enema, and, after they have acted, the rectal stitch may be removed. The patient must keep her bed for a fortnight, and it is well to have the knees bound together. I have had equally good results by the administration, every other day, of an olive-oil enema. In fact, it is the plan that I generally adopt. We get rid of the unpleasant complication of the locked bowel, and the risk attendant upon the passing of hard fæcal masses, with the consequent rectal irritation. Perfect cleanliness must be enforced

after the operation, and the vagina should be carefully washed out each day with tepid permanganate of potash injection. It is well to keep a dry thymol pad over the wound, with a light perinæal bandage.

Tait's Operation.—I am indebted to the late distinguished gynæ-

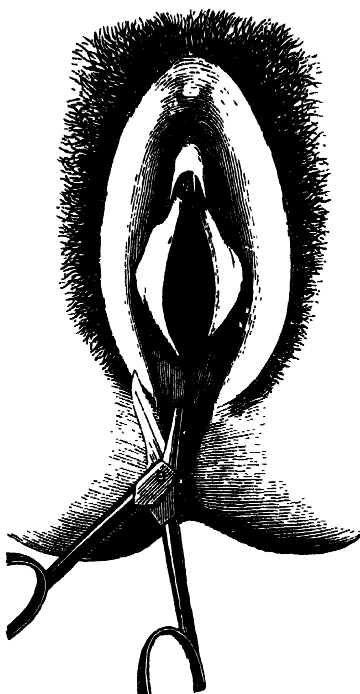


FIG. 240.—SPLITTING THE RECTO-VAGINAL SEPTUM.

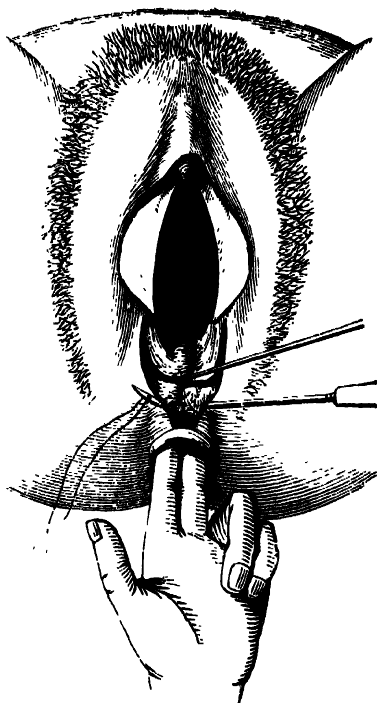


FIG. 241.—PASSAGE OF THE SUTURE.

These three drawings (Figs. 240, 241, 242) were made for Fancourt Barnes by Professor Vulliet, of Geneva.

cologist for the following description of his operation, which he kindly wrote for a previous edition of this work.

'The operations are of two kinds. The first I term extension of the perinæum from behind forwards, and for this I make, by means of a sharp pair of pointed scissors, a horseshoe incision round the perinæum, the horns extending as far forwards as I judge to be necessary. It is made deeply into the substance of the labia on each side, and when its flaps are separated it makes a V-shaped groove on each side. As many silk-worm gut sutures as seem necessary—generally three or four—are inserted by a handled needle, the needle entering well within the margin of the wound, so as to open out

the V completely and evert its lips. The outer flaps of each V on the several sides are turned outwards, and the inner turned correspondingly inwards; and when the stitches are tightened they are in this way approximated as plane surfaces, and so they unite, making a very firm and thick platform for the displaced organs to rest upon, and this rarely gives way. I generally now leave the sutures in for three or four weeks.

'For torn perinæum the operation again is the same in principle, though different in detail. When the marginal folds of the buttocks are fully drawn asunder in such a case, the old tear is displayed by a thin white line of cicatrix extending transversely to the axis of the rent, which of course was at right angles to the plane of the perinæum. The healing of the tear has taken another direction altogether, and we have the cicatrix at right angles to the wound. This is, so far as I can think out the question or know the facts, wholly unique in its occurrence. It forms the basis of the principle of the operation which I perform, and that is absolutely the opposite of the principle of all denuding operations. *The scheme of my operation is to restore the old rent and unite it at right angles to its representative cicatrix, that is, at right angles to the plane of the perinæum.* In this way, and in this way only, can the perinæum be truly restored, and from this operation alone can it be hoped that the restoration will stand the attacks of subsequent labours, as a large number of my restorations have done. do not know one having been torn a second time.

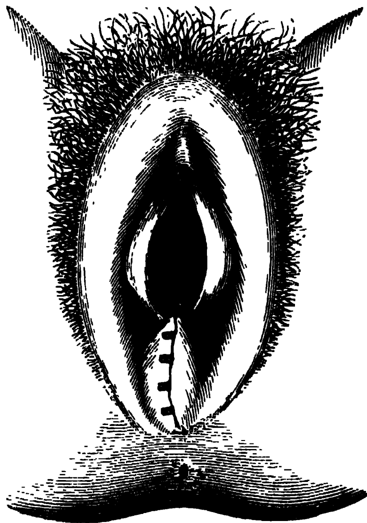


FIG. 242.—WOUND CLOSED.

'Having the folds of the buttocks pulled firmly apart, so that the cicatrix is put on the stretch, I enter the point at its extreme edge on one side, and, keeping strictly to its line, I run through to its other extremity. The incision is about three-eighths of an inch deep, and it forms two flaps, a rectal and a vaginal. From each end of the incision it is carried forward into the tissue of each labia for about an inch, and again backwards for about a third of an inch, making a wound like this—

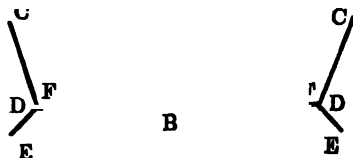


FIG. 243.—D to E, rectal incisions; F to C, vulvar incisions. D to D marks the line joining the vulvar and anal rents.

'The vaginal flap A is held upwards (the patient being on her back), and the rectal flap B being turned downwards, the angles A F C being pulled by forceps diagonally upwards and inwards towards the middle line, and the angles B D E being pulled downwards and inwards. The lines C E thus become straight, and the wound takes this form—

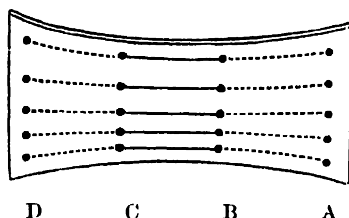


FIG. 244.

'By means of a stout-handled and well-curved needle the silkworm-gut sutures are entered on one side about an eighth of an inch within the margin of the wound (so as not to include the skin) at the dots A. They are buried deeply in the tissue as far as B, and then the needle is made to emerge so as to miss the angle of the wound. The needle again enters at the large dots C and emerges at the dots D. By thus missing the upper or deep angle of the wound between B and C, the two great and divided masses of the old perinæum, which lie in the parallelograms respectively bounded by the lines of large dots A—B and C—D, are accurately adapted. The rectal and vaginal flaps respectively point into the rectum and vagina, and, like an old-fashioned flap-valve, prevent noxious material entering the wound. The resulting mass of perinæum is amazingly large; union is almost inevitable, for I have failed only twice

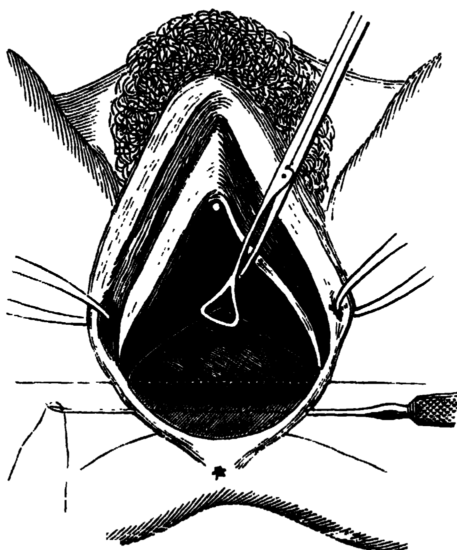


FIG. 245. — DOLÉRIS' MODIFICATION OF TAIT'S OPERATION. RAISING OF THE SEMILUNAR FOLD, AND INTRODUCTION OF THE SUTURES.* (Bonnet and Petit.)

* The vaginal flap is resected above the line of the suture shown in the drawing, and thus the closure of the vaginal denuded surface, and the remaining portion of the raised tongue of mucous membrane, is secured.

in many hundreds of cases, and then because there had been previous denuding operations. The resulting cicatrix is absolutely linear, and so resembles the natural raphe, that in three or four months after the operation it is quite impossible to determine, from the appearance of the parts, that the perinæum has ever been injured, for there are no stitch-hole marks left to tell the story. The pain experienced after the operation is trifling compared to the old method of quilled or shotted suture. *I leave the stitches in for three or four weeks, and take great care that the rectum and vagina are washed out twice daily*' (Lawson Tait).

Doléris performs a further modification of Tait's operation, which he styles 'Colpoperinéoplastie par glissement.' The minute steps of this operation it is not necessary to describe here. The vaginal flap, having been raised and bared, is brought at the middle point of its base to the centre of the cutaneous margin of the wound. The flap is then fixed in its new position by a series of sutures, three in number, carried from the cutaneous margin through the lower border of the vaginal flap from one side to the other, beginning in the centre. A final terminal purse-string suture of the nature before referred to is passed so as to secure complete and deep adaptation of the tissues.

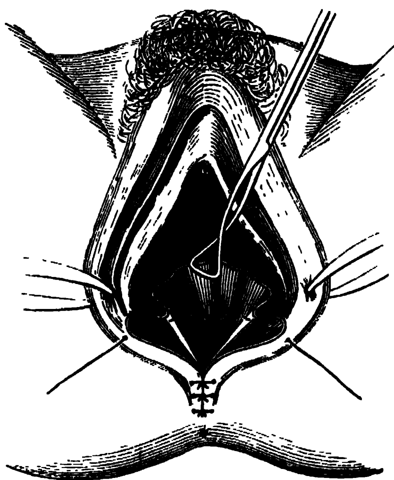


FIG. 246. — 'COLPOPERINÉOPLASTIE PAR GLISSEMENT,' SHOWING THE TERMINAL PURSE-STRING SUTURE. (Bonnet and Petit.)

In grave cases, in which there is also prolapse of the vagina, Dührssen combines the three steps, vaginal fixation, anterior colporrhaphy, and perineorrhaphy, but Edge advocates double lateral colporrhaphy, combined with vaginal fixation and perineorrhaphy; firstly, curettage and disinfection of the uterus; secondly, redisinfection of operator and assistants, and thorough cleansing of vagina and vulva; thirdly, vaginal fixation as far as the insertion of the sutures; fourthly, double lateral colporrhaphy as far as insertion of the sutures; fifthly, tying of both sets of sutures. Continuous sutures of the finest silk are used for the colporrhaphy.

The vaginal fixation sutures are removed after six or eight weeks, the perinæal after a month.

Lateral Colporrhaphy.—In this operation, a zone of the vaginal mucous surface at both sides of the canal is denuded from the caruncula myrtiformes as far as the neck of the uterus. The extent of the denudation, however, must depend on the degree of vaginal prolapse. The anterior and posterior vaginal wall are united by sutures which are passed obliquely, and embrace all the cellular tissue.

Operations for Vaginal Prolapse.—The operations for prolapse of the vaginal wall may be considered in connection with prolapse of the uterus. This vaginal prolapse may be attended by a rectocele or a cystocele. In the one case, the rectum protrudes into the vaginal canal, and may be dragged down with it outside the vulvar orifice. In the other, the bladder accompanies the prolapse, frequently occupying portions of the procident mass. The position and direction of the urethra is altered (Figs. 230, 231).

The pathology of this condition we have considered in relation to prolapse of the uterus (pp. 274–279). There is little difficulty in detecting either anomaly. A soft bulging swelling is felt, posteriorly or anteriorly, pressing into the vaginal canal, or appearing at the vulva, and the diagnosis is further verified by introducing the left forefinger into the rectum, while the right is made to oppose it from the vaginal surface. The catheter or sound may be used for a similar object in the instance of a cystocele.

Operations intended to produce Contraction of the Vaginal Canal—Colporrhaphy.—The principle of these operative procedures consists in the removal from the vagina of portions of the mucous membrane from the anterior or posterior wall, or from both. The shape of the portion removed, whether the triangular form of Sims, the variously fashioned surfaces exposed by Emmet, the pentagonal of Simon, or the oval denudation of Dieffenbach, is of secondary importance. Sims' operation (colporrhaphy) is that perhaps most frequently performed.

As the simplest of operative measures, that of Marion Sims may be selected. It consists of the following steps: First, the anterior wall of the vagina (which is the primarily prolapsing portion) is hooked up and down well towards the posterior wall; secondly, with Emmet's or Sims' scissors, a V- or trowel-shaped portion of the mucous membrane is removed, the apex at the neck of the bladder, and the arms extending to the sides of the cervix uteri;

thirdly, the denuded surfaces are brought together by sutures (of silver wire or silkworm-gut) passed transversely. Sims, in his later operations, left a small portion of undenuded tissue at (*e*) to permit the escape of any pent-up secretion.



FIG. 247.—SIMS' COLPORRHAPHY.

It has to be remembered that we have three distinct abnormal states to consider in connection with this operation: primary prolapse of the vagina (antecedent to the prolapsus uteri), hypertrophic elongation of the cervix, and prolapsus uteri. Associated with the descent of the uterus are the two fundamental errors—want of vaginal support, and uterine traction. Increase of uterine weight is the third most important factor. No operation can carry with it the assurance of correcting all these conditions, nor yet a series of operations. Hence we can give no guarantee of any permanent result.

The denudation of the vaginal mucous membrane may be effected with either scissors or bistoury. If care be taken, the scissors has certain advantages. I prefer to employ both instruments at different stages of the operation. Good gut ligatures are the best to use. Simon performs anterior colporrhaphy by the removal of an oval portion of the vaginal mucous membrane, the poles of the oval being pointed and brought to an acute angle. The long diameter

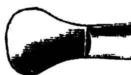


FIG. 248.—COLPORRHAPHY KNIFE OF MARTIN.

of the denuded surface corresponds to the relaxed portion of the vaginal wall. The shape of the flaps, however, must depend in great measure upon the size and situation of the prolapse. The boundaries of the apex, nose, and sides of the proposed raw surface are limited by fixing forceps. The number and direction of the sutures will depend upon the size and shape of the colporrhaphy. In all these operations it is essential to operate with celerity, and to restrain the hæmorrhage by irrigation with hot water.

Gerstung, in the *Centralblatt für Gynakologie*, February, 1897, on the theory that vaginal cystocele is the result of either laceration or

extreme stretching of the vesico-vaginal fascia, on which the bladder rests, recommends that the anterior vaginal wall be split in its whole length, and the part of the bladder-wall which prolapses to be pushed

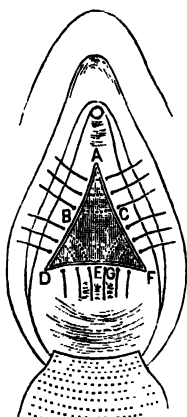
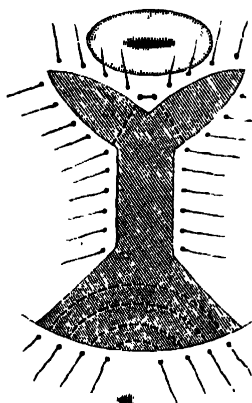


FIG. 249.—ANTERIOR COLPORRHAPHY, SHOWING THE SUTURES THAT CLOSE THE THIN ANGLES. (Doléris.)



FIG. 250.—ANTERIOR COLPORRHAPHY, SHOWING THE PASSAGE OF THE FINAL SUTURE, *u*, *r*, *x*, *y*. (Doléris.)

towards the interior of the bladder, then by means of numerous sutures the paravesical cellular tissue or fascia to be drawn together



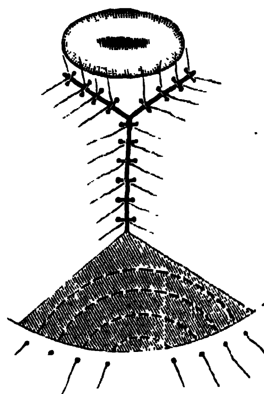


FIG. 251.—REAMY'S OPERATION FOR RECTOCELE.

in a long fold or plait, so as to form a sure support for the vesical wall. The vaginal incision then is closed.

Colpoperineorrhaphy.—Various procedures are practised with a

view of curing a rectocele and a prolapse of the vagina. When such a prolapse occurs with a lacerated or deficient perinæum, colpoperineorrhaphy is performed.

The principle of Reamy's operation is shown in Fig. 251. The desired extent of surface of the posterior wall of the vagina is denuded, as shown in the drawing, two arms of the wound being carried upwards and outwards at each side of the cervix. Catgut ligatures are used. A most important suture is that shown by the dotted lines crossing the upper wings of the wound; this suture is carried from the angle formed by one extending arm with the denuded surface on the posterior wall, to the angle of undenuded surface beneath the cervix. It is drawn out here and reintroduced at a corresponding point of the apex, about one-fourth of an inch from its point of emergence, and is carried across the denuded arm. It is brought out a quarter of an inch from the margin at a corresponding spot (in the opposite angle) to the point of entrance. This suture brings the three angles of the wound together (Fig. 251.

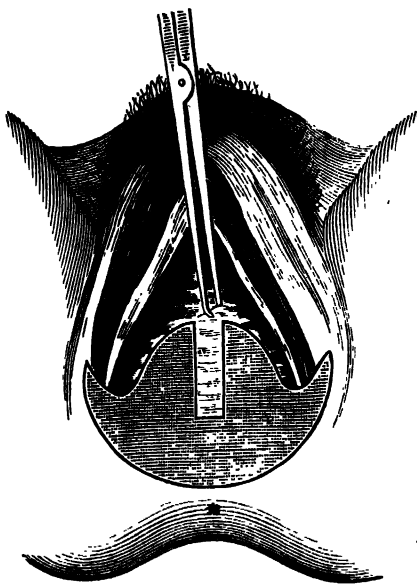


FIG. 252.—COLPOPERINEORRHAPHY. (Martin's method.)

The form of Hégar's operation is triangular, with the apex at the neck of the uterus, and the base at the perinæum. That of Martin is shown in Fig. 252. The denuded surface is divided into two portions by a column of mucous membrane, which he purposely leaves. Martin closes the vaginal wound before he vivifies the perinæal edges. There is danger of non-union occurring through the untouched central column of mucous membrane.

Amputation of the Cervix.—This operation is performed more frequently on those advanced in life. The best method of removal is by means of the knife or scissors (not the écraseur or galvanic

wire). The stump is covered with the vaginal tissue (Sims) by means of silver sutures, four to six, passed from before backwards through the cut edges of the vagina. Thus we leave a small oval opening corresponding to the cervical canal. Emmet drew particular attention to the evils which accrue to the woman if the stump be allowed to heal by granulation. These are partially due to contraction or closure of the uterine canal and subsequent re-enlargement of the uterus, and partly to reflex irritations and the effects on nutrition.

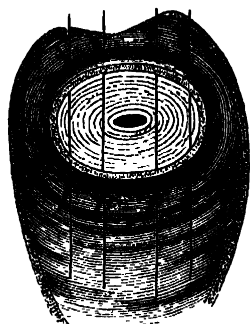


FIG. 253.—AMPUTATION OF THE CERVIX. (Sims.)

Schroeder's Operation.—We require for it a duckbill speculum; two vaginal retractors; two long-toothed forceps; two bistouries, with short broad blades; a pair of straight and strong scissors; a dozen small torsion forceps; a few toothed dissecting

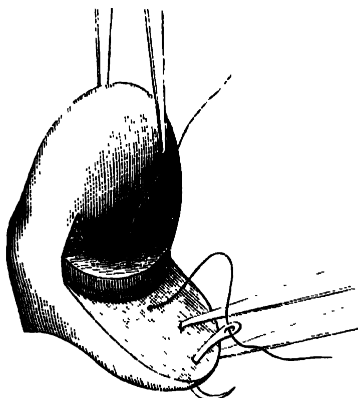


FIG. 254.—SCHROEDER'S OPERATION OF AMPUTATION OF VAGINAL CERVIX, SHOWING THE TRACK OF THE CENTRAL SUTURE ACROSS THE EXSECTED LIPS. (Bonnet and Petit.)

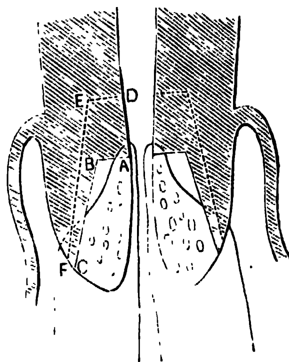


FIG. 255.—SECTIONAL VIEW OF SAME. A, B, C, exposed surfaces of flap; D, E, F, track of supra-vaginal incision; A, F, suture.

forceps; an irrigator; special needles, flat and curved, with needle-holder; catgut and silver wire; and a receptacle for the irrigating fluid. The neck, which is drawn down and held firmly by an assistant, is bilaterally divided as far as the vaginal fold. The divided lips are then well separated, and a curved incision, with the convexity

anteriorly, is made at each angle. Another semicircular incision is now carried to the depth of some millimetres through the uterine tissue, from one angle of the denuded anterior lip to the other; and the bistoury being then turned flat in the groove, it is carried through the uterine neck at right angles to the transverse incision, leaving thus a raw surface, as shown in the figure. This angle is then united by three sutures. The curved needle of Sims is carried in the manner shown in the drawing beneath the exposed surfaces, entering at a short distance from the margin of the first incision, and emerging at the upper third of the larger flap, to be re-entered again at the lower third. The central suture, before tying, is shown in Fig. 254. This one is first inserted; the three are caught in a torsion forceps, and left, while the anterior lip is being treated in the same manner. When the two denuded lips have been sutured they are drawn asunder by the threads, and the borders of the lateral incision are freshened. These are next carefully united at either side by suture. Atresia is prevented by securing the exact adjustment of the cervical and vaginal mucous surfaces of both lips and by preventing any intervening protrusions between the sutured points. Also the external os uteri is made slightly larger than natural, and is kept open at the close of the operation by the insertion of some iodoform gauze.

Martin's Operation.—The cervix having been seized with two tenacula, or by a few strong threads of silk which are passed through and tied, is drawn well down. An anterior incision is carried across the uterine wall, and the mucous membrane raised as far as the vaginal vault, avoiding the bladder and the peritoneum. Two lateral incisions are now made, dividing the uterine neck as far as either extremity of the transverse cut. The anterior flap is formed by a triangular incision through the anterior uterine wall, which is thus excised. The mucous membrane is now stitched with a series of catgut sutures to the uterine mucosa. The posterior flap is made in a similar fashion, and it also is united to the mucosa. Other sutures are passed laterally, bringing the mucous membrane together, and leaving the opening of the uterine canal at the most dependent part. The operation may then be amplified by lateral anterior and posterior colporrhaphy, or, after thorough disinfection of the hands, ventro-fixation may be performed.

Simon Markwald operates by the removal of a cone-shaped portion of each lip, with the base below. These two flaps are united by

catgut sutures, and the lateral incisions are brought together as in Schroeder's operation.

Various other operative procedures are practised in extreme cases of vagina procidentia, such as *episiorrhaphy* (Le Fort), *fixation of the vagina* (Péan), *colpohysteropexy* (Sänger, Nicolétis, Richolet).

Episiorrhaphy is closure of the vaginal opening. It may be occluded to the extent of complete closure, a space being left for the passage of the urine; or it may only be so contracted as to permit of coitus. Le Fort bares two rectangular surfaces—one on the anterior, and the other on the posterior, wall of the vagina, and unites these by sutures. Péan fixes the vagina to the rectum behind, and to the bladder in front. In *colpohysteropexy* the neck of the retroverted uterus is amputated, and the posterior vaginal wall is fixed to the anterior edge of the uterine stump. Three catgut sutures are used to attach the posterior half of the uterine stump to the posterior lip of the vaginal incision. Other sutures pass, at each side, from this same lip to the anterior edge of the uterine stump, and these include the vaginal mucous membrane, so as to cover the lateral portion of the uterine surface with it. The remaining margins of the vaginal wound are then brought together by sutures. The operations of Byford, Rahenan, and Jacobs are but modifications of these methods (anterior and double colpo-hysteropexy).

Hysterectomy with Colporrhaphy for Total Prolapse.

Wolff has recorded the results of eighteen operations in ten years at the Dresden Poliklinik, the ages of the patients varying from thirty nine to seventy-eight. Leopold operated on seventeen of these cases. There were three deaths after operation. Two of these were accounted for by pneumonia and cardiac syncope, due to hypertrophy and dilatation. The subsequent histories of twelve cases were traced. All these were in good health, and able to work.

In regard to this radical procedure, which has not hitherto found many advocates in this country, we would quote the dictum of Wolff himself, viz.: '*The danger of a surgical proceeding should be at least not greater than the danger to life of the condition which the operation is destined to cure.*' When we find that a mortality of 16·6 per cent. followed the performance of the operation in the most capable hands, we may pause before advising so radical a measure for a condition which in itself is not dangerous to life, notwithstanding

PLATE VIII.

Case I.

FIBROMATOUS UTERUS REMOVED BY VAGINAL HYSTERECTOMY FOR PROLAPSE OF 15 YEARS' STANDING, SHOWING ADHESIONS. RETURN OF THE BLADDER INTO THE PELVIC CAVITY. (Author.)



See reverse side for diagrammatic sections of Cases I. and II.

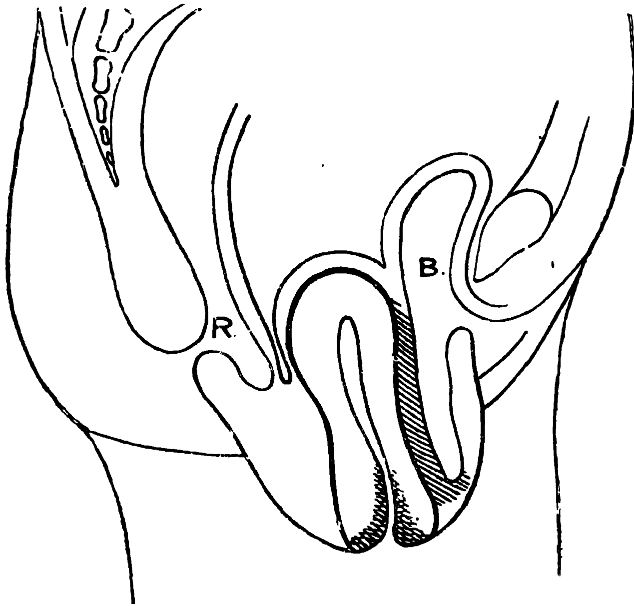
PLATE IX.

Case II.

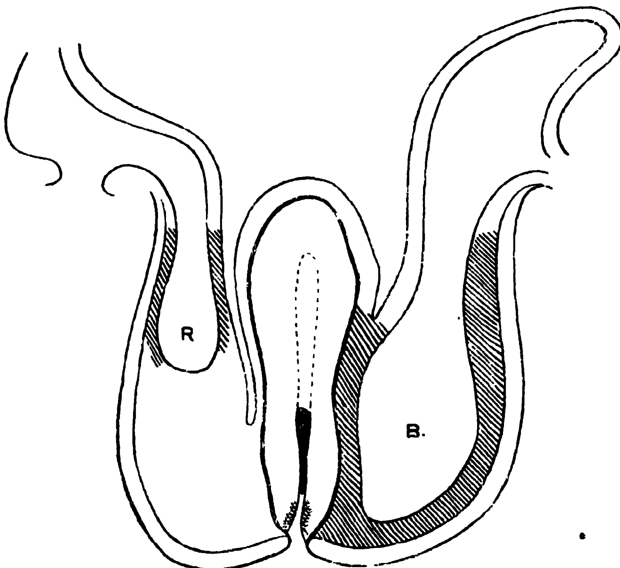
SENILE ATROPHIC UTERUS REMOVED FROM PROCIDENT SAC AFTER THE RETURN OF THE BLADDER AND RECTUM INTO THE PELVIC CAVITY, IN A PATIENT AGED 71 (Author.)



[*To face* p. 298.



Case I. (p. 299).—Sectional Drawing, showing Extent of Adhesions to the Bladder.



Case II. (p. 300).—Sectional Drawing, showing Extent of Adhesions to the Sac Wall, Bladder, and Rectum.

its consequences and inconvenience. Some operators, as in the case in question, appear to think that the hastening of a patient out of the world through the influences exerted by an operative procedure on some collateral or organic disease in the viscera to which she may have been a victim, such as disease in the heart or lungs, is justifiable. To perform ablation of the uterus, and a protracted operation on a patient with emphysema of the lungs, with cardiac hypertrophy and dilatation, is only to bring the gynæcologist's art into disrepute. At least, the less dangerous steps of colporrhaphy and abdominal fixation should first be tried, when we have failed with all forms of support to give relief, before we advise the removal of the uterus.

On the other hand, there must occur, and not infrequently, cases in which no support can be applied, nor can we hope for cure from any vaginal operation; and this would mean a life of misery to a patient whose daily bread may depend upon her ability to work. Morbid processes also may have occurred in the procident tumour, and the bladder be involved. Here, amputation of the cervix or hysterectomy is justifiable, and should be performed, the patient having been told the risks of the operation.

Case of Extreme Procidentia Uteri with Fibrom and Prolapse of the Bladder of Fifteen Years' Duration—Hysterectomy with Ablation of Portion of Vagina—Recovery. (*Case I., Plate VIII.*)

Patient was married sixteen years. She had six children. Uterus was first prolapsed fifteen years since, after the birth of her first child. It then yielded to treatment till the birth of the fourth child. She has been gradually becoming worse since, especially for the last few years, and has worn a support and belt, which did not give relief. She has an occupation which demands continual standing. A large procidentia protruded between the thighs, and the uterus could be felt considerably enlarged. There was a deep erosion round the os uteri, with a suppurative discharge from the endometrium. The sound passed for about four inches downwards into the procident mass almost to a level with the external os. The catamenia were very frequent, dark in colour, and there was profuse bleeding.

I determined to remove the uterus and resect a portion of the prolapsed vagina.

The difficulty of the operation consisted in the freeing of the bladder from the uterus, to which it was adherent, as may be seen from the plate, for the greater part of its anterior surface. This was done by alternative working with the finger-nail towards the uterus, curved blunt-pointed scissors, and a small piece of sponge or gauze on holder. There was an interstitial fibroid in the fundus of the uterus. The rectum was partly adherent behind. A small flap

of vagina was removed at either side. The peritoneum was laterally united with the vagina, a sterilized iodoform drain was passed into the peritoneal cavity, and the patient was treated as after an ordinary vaginal hysterectomy. With some variations and a comparatively high temperature range which continued till the fourteenth day, and which I attributed to the separation of the ligatures and the discharge which ensued, the patient made an admirable recovery, being out of bed on the twenty-first day after the operation, and returning home on the twenty-sixth. She has been perfectly comfortable ever since, and there has been no tendency to the least return of the prolapse of the vagina.

Case of Extreme Procidentia Uteri of Twenty-five Years' Duration with Prolapse of Bladder and Bowel, and Adhesions both to the Sac Wall and the Uterus—Hysterectomy—Ablation of Portion of Vagina—Recovery. (Case II.—Bladder—Plate IX.)

Mrs. S., aged 74, had suffered from prolapse for twenty-five years. Of late she had been entirely confined to the house and unable to walk. In addition there was inability to control the bowel, and she had difficulty also in emptying the bladder. The tumour bore all the evidences usually present in old prolapse. The uterus could be felt atrophied and fiddle-shaped in the centre of the mass. The bladder reached close to the lower margin of the cervix. The cervical canal was closed a short distance from the os uteri; the latter was eroded, there was purulent discharge and ulceration in the surrounding edges of the cervix. The operation performed was the same as in the last case, only much more difficult. The bladder wall was practically one with the wall of the sac in front, and had to be slowly dissected off in the manner mentioned before. The ureters were exposed in doing this. The posterior surface of the bladder was adherent to the uterus, and this also had to be detached. The bladder was now free. The uterus was brought down, and the broad ligaments were ligatured at each side by three ligatures which included all vessels. In doing this the rectum was found partly adherent to the upper and posterior part of the uterus, and this was freed. The uterus was now removed, the bladder being returned into the pelvis and supported there by iodoform gauze. The rectum was pushed up from below, and dissected off from its attachment to the posterior wall of the sac. The rectum was also returned into the pelvis, and supported. A semi-circular flap was now cut anteriorly and posteriorly from the vagina. The peritoneal edges were brought together with those of the vagina and the vault closed, and the vagina tamponed with iodoform gauze. The patient was out of bed in three weeks. The temperature range continued nearly normal, but, on finding a tendency for it to rise and the pulse to become somewhat hard, on the tenth day after operation, I determined to remove all sutures, whereupon there was an escape of rather fœtid pus. The vagina was subsequently drained with iodoform gauze, and frequent douchings with weak formalin solution were used. Further than some trouble with the bowel, which was easily overcome, there has been no other interference with recovery, and the vagina keeps perfectly in position.

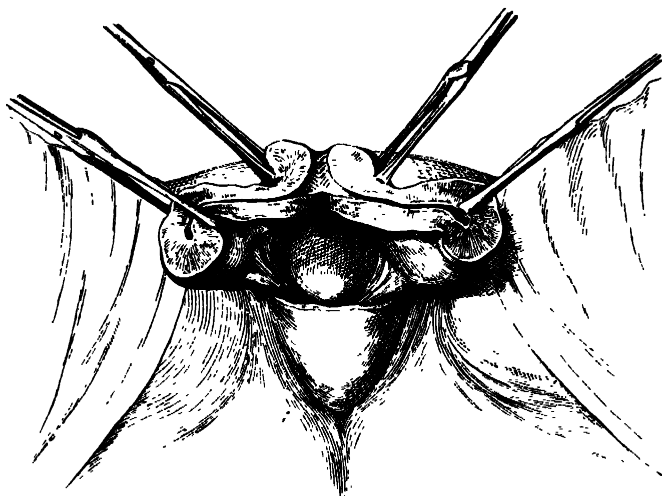


FIG. 256.—DISSECTION OF THE UTERUS IN TWO PARTS, FROM BEHIND FORWARD. (Doyen.) The fundus having been drawn down through the pouch of Douglas.

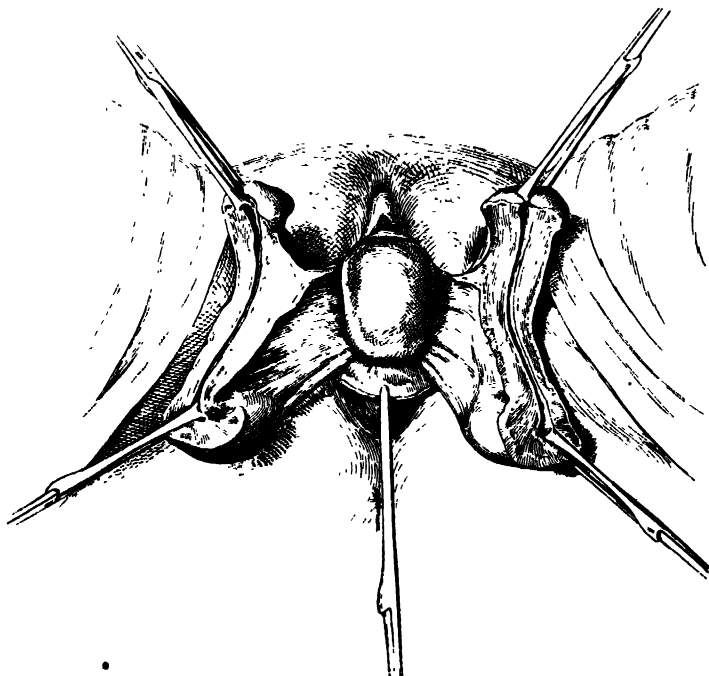


FIG. 257.—COMPLETE SEVERANCE OF THE UTERUS—THE NECK ABOVE—PROTRUSION OF THE BLADDER. (Doyen.)

I have just operated on a patient, aged 42, with prolapse of fourteen years' duration, by suspension of the uterus. Here the uterus was healthy.

Doyen's Operation for Inveterate Prolapse.—Doyen remarks on the difficulties which have to be contended with in freeing the bladder in these cases and in ablating the uterus. The operation he performs he divides into five stages, or six if colpoperineorrhaphy be performed. He first opens the pouch of Douglas, and, drawing the neck of the uterus well up and in front, enlarges the opening and brings the fundus of the uterus down. He then divides the uterus by a posterior section as far as the fundus, and then continuing along the anterior wall until he arrives at the bladder, which he cautiously detaches. The uterus is thus brought in two halves into a state of retroversion. The mucous membrane of the anterior vaginal cul-de-sac is now divided, and any attachments of the neck are separated with the fingers. Should there be bleeding, it is arrested by forceps. The adnexa are now ligatured and the pedicle secured, the broad ligaments being first tied *en masse*, and then secured in two halves by transfixion. The bladder being replaced, either half of the uterus is convenient for traction on the broad ligaments, and for facilitating the peritoneal toilet and the section of the broad ligaments. We are then enabled to completely close the peritoneum after resection of the uterus, by bringing its anterior and posterior flaps together, while we fix the pedicles. He completes the operation by the performance of an anterior colporrhaphy and a perineorrhaphy.

Relaxed Vaginal Outlet.—Howard Kelly, in his recent work, enters fully into the clinical appearances and treatment of this condition, which is so frequent an accompaniment of cystocele and rectocele, and which may have been present prior to, and independent of, any laceration of the perinæum. The appearances as noted by him are those we are familiar with—a wide and somewhat everted anus, a flattened and broad buttock cleft, with the skin surface of the perinæum unusually deep, while the fourchette is intact. On the other hand, the skin surface of the perinæum may be torn, while the deeper structures have not been involved. He insists on the fact that in many of the worst forms of relaxation the perinæum is deeper on the skin surface than before childbirth, a condition due to the overstretching of the external skin at the time the outlet is broken down. On separation of the labia, there is pouting or protrusion of one or both of the vaginal walls. We can best estimate

the degree of protrusion, and associated descent of the cervix uteri, by examination by the finger of the latter while the patient is standing. Examination of the perinæum will demonstrate its relative thinness, and the strength or displacement of the levator ani fibres, the degree of relaxation and consequent effect on the pelvic organs, depending upon the degree of interference with, and the disposition of the fibres of, this muscle. The administration of an anæsthetic, by preventing contraction, enables us to more completely determine the extent and degree of the relaxation. Kelly performs for the cure of this condition a bi-lateral symmetrical operation, based upon the principle of that of Emmet. For a more complete description of Kelly's procedure I must refer the reader to his work. The steps are as follows :—



FIG. 258.—RELAXED VAGINAL OUTLET. (Howard Kelly.)

The operation consists in free denudation (the form and size depending on the degree of relaxation) of two triangular surfaces on the vaginal sulci at either side, the outline being completed by a semi-circular incision extending around the posterior wall from a point within the hymen above, and embracing any scarred tissue below. A large wound area is thus left, on which is seen a narrow undenuded area between the two triangles. The denudation is effected with curved scissors,

the whole thickness of the vaginal wall being removed in strips from one-tenth to a fifth of an inch broad. Hæmorrhage is checked in the usual manner, and if necessary, buried sutures are used. Approximation is secured with silkworm-gut and catgut sutures. The mucosa of each triangle is united at either side with the strip of undenuded tissue in the centre, and thus each vaginal sulcus which has been denuded is closed, and the edges of the remaining raw area below this are brought together by a suture of silkworm-gut which embraces the upper angles on the sides, and transfixes the rectocele. (The reader will refer to Howard Kelly's recent work on 'Operative Gynæcology' for a complete description of the operation and complete illustrations of the various stages.)

Howard Kelly ridicules what he terms the mechanical theory of the so-called perinæal body being the support of the vagina and uterus. The real supporting mechanism of the outlet, he says, is not the perineal body, but the anterior portion of the levator ani muscle. Rising on either side of the pubic ramus, and passing back round the lateral vaginal wall, it unites with its fellow behind the rectum, its fibres being intimately interwoven with the lateral walls of the rectum. The vaginal introitus is but a narrow chink between this posterior muscular band and the pubic arch. It has no direct means of closure such as would be afforded by a powerful sphincter muscle. The levator muscle indirectly supports it. By its contraction the lower end of the rectum is lifted up under the pubic arch, and the vagina is flattened out and held up between the two, the position of the plane of the pubic arch rendering the closure more efficient. This arrangement it is which gives the sigmoid curve to the lower extremity of the virgin vagina.

The fact that, notwithstanding the absence of the perinæum, prolapse of the vagina and uterus but rarely occurs, Kelly contends is irreconcilable with the view that the function of the peritoneum is to plug the pelvic outlet 'like a cork.' As the tear extends generally along the median line, the lower fibres of the levator ani muscle are uninjured, and hence prolapse does not occur. This is not the case when the tear branches laterally.

Howard Kelly's Operation for Complete Tear of the Recto-Vaginal Septum.—The steps of the operation are as follows :—

'The area to be denuded must be outlined with the scalpel, which follows the direction of the scar tissue in a general way, greatly exaggerating its outlines; the cardinal principle in the denudation is to reproduce as nearly as possible the original injury.

'The first incision splits the septum and includes the sphincter ends, from which a line is continued up under the pubic arch on either side; thence it goes down into each vaginal sulcus and back again, meeting in front of the posterior column, 1 to 2 centimetres ($\frac{2}{5}$ to $\frac{1}{2}$ inch) above the first incision in the septum. All of the tissue included within the outline is now removed. One of the sphincter ends is caught up with tissue-forceps and cut free with curved scissors. The denudation is continued around the sharp edge of the septum to the opposite end of the sphincter, which is denuded in the same way, taking care to remove all scar tissue. A second strip above, and parallel to this, is next cut off; and a third, and so on, continuing the denudation up into the vagina until the whole area within the outline has been removed. It is important to bear in mind that the denudation within the vagina must extend a centimetre or more ($\frac{1}{5}$ an inch or so) above the angle of the tear, in order to avoid the tendency to form a recto-vaginal fistula at this point. Silkworm-gut and catgut sutures are best adapted to the approximation of the denuded surfaces. Half-deep sutures of catgut are preferable for closing the rectal side of the tear, and for securing accurate approximation between the silkworm-gut sutures, which are used at wider intervals. The complication of the torn bowel is first disposed of by a series of interrupted rectal sutures, commencing at the upper angle of the tear, entering each suture at the margin of the rectal mucosa, and emerging on the wound surface 4 to 5 millimetres ($\frac{1}{10}$ to $\frac{2}{5}$ inch) distant, re-entering on the opposite side and coming out again on the margin of the mucosa, at a point corresponding to that of its entrance. This suture may be tied at once, and dropped into the rectum; and a little less than a half centimetre ($\frac{1}{5}$ inch) below this, another suture is passed in like manner, tied, and dropped, and so on until the whole of the rectal rent



FIG. 259.—RECTAL SUTURES NOT TIED. Silkworm-gut suture shown passing well through the septum from behind the sphincter, at either side. (Howard Kelly.)

has been obliterated down to the sphincter. One of the most important points in the operation now is to secure an accurate approximation of the sphincter ends by two or three sutures radiating from the rectum out on to the skin surface. The contractions of the sphincter render it necessary to assist these sutures with one of silkworm-gut introduced well behind to the denuded ends,



FIG. 260.—COMPLETE TEAR OF THE RECTO-VAGINAL SEPTUM. Rectal sutures all tied except the silkworm-gut tension suture. The sutures are shown introduced in the right vaginal sulcus. (Howard Kelly.)



FIG. 261.—RECTAL AND VAGINAL SUTURES ALL TIED. Perinæal sutures introduced, but not tied. (Howard Kelly.)

and passing up through the septum. When this has been done the rectal rent is repaired, the wound is reduced from a complicated one involving three surfaces—rectum, skin, and vagina—to a simpler wound involving vagina and skin perinæum.

'The next step is the repair of the vaginal wound by a silkworm-gut suture in either sulcus, reaching down to the series of rectal sutures, at the bottom of the wound. The loop of the suture should lie in a plane nearer to the operator than its points of exit and entrance, so as to lift up the tisues at the bottom of the wound when it is tied. Superficial and half-deep catgut sutures complete the union within.

'There still remains an opening on the skin surface, which is readily brought together by a silkworm-gut suture, aided by a few superficial or half-deep catgut sutures.'

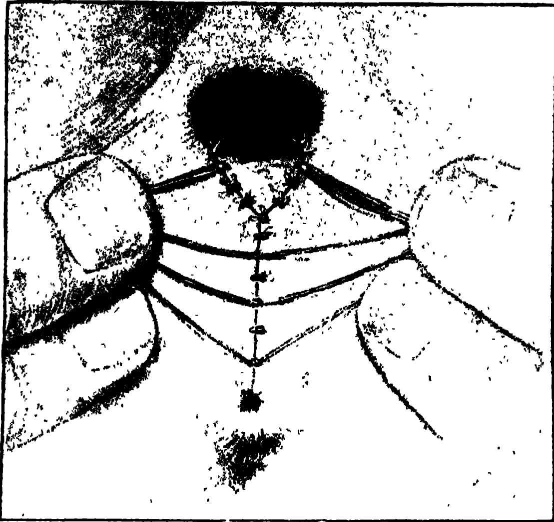


FIG. 262.—ALL THREE SETS OF SUTURES TIED. Silkworm-gut suture allowed to remain long. (Howard Kelly.)

Ascent of Uterus.—The uterus recedes from the reach of the examining finger. It is well to bear in mind in practice that this recession of the uterus may be associated with (*a*) *pregnancy;* here we have (after the third month) the other local signs of pregnancy; (*b*) *ovarian tumours*—frequently in ovarian disease the uterus is not only drawn up from the pelvis, but the cervix is shortened, and the os uteri may be felt almost on a plane with the vaginal roof; (*c*) *fibrous and fibro-cystic disease of the uterus;* (*d*) *abdominal tumours* (springing from or connected with the abdominal viscera), as hydatid tumours, cystic growths, malignant disease; (*e*) *peritoneal effusion* (hæmorrhagic, serous, or purulent), pelvic and abdominal, with consequent adhesions; (*f*) *pelvic tumours*, occurring in connection with the rectum or vagina, or in Douglas' space. It is a

matter of considerable importance in arriving at a diagnosis, when we discover a receding uterus, to determine carefully which of these conditions are operating in causing a recession of the organ.

The following table may assist in the differentiation of the conditions which may cause upward displacement of the uterus so far as the vaginal and bi-manual examination are concerned.

Early Pregnancy.—Uterine neck—shortened and softened Os uteri soft, directed backwards—uterine fundus globular.

Ovarian Tumour.—Cervix uteri considerably shortened, but not softened as in the pregnant condition; os uteri unaltered; often hard and possibly of the sterile type; uterine canal normal in length.

Fibromyomata and Fibro-cystic Tumours.—Cervix frequently hard, giving the characteristic feel of fibrous development; often conical in shape; the mucous envelope movable over the interstitial tissue; uterine canal lengthened; continuity of tumour with uterus diagnosed bi-manually and by the uterine sound.

Abdominal Tumours.—The entire uterus is frequently displaced, and pushed out of position to either side, or backwards towards the pouch of Douglas. The cervix is unaltered in size or consistence. The os uteri may or may not be of the normal character, so far as shape and size are concerned. The uterus in the majority of cases can be moved with the sound independently of the tumour. By bi-manual examination it will be disassociated from the latter, while the uterine canal will be found of the normal length.

Peritoneal Effusions.—The uterus is frequently fixed, or moved with difficulty. The cervix in pelvic effusions is often soft and swollen, and sensitive to the touch. The os uteri is also soft, and if there have been endometritic inflammations it may be irregular in outline and surrounded by an erosion, while there is also a discharge from it. Bi-manually, the uterus will be felt displaced to either side, if the effusion be lateral, and if surrounding the uterus there will be the 'board-like' feeling of the vaginal vault, and the accompanying difficulty of isolating the uterus from the peri-uterine hard effusion, which in some cases may be mistaken for a fibroid filling the pelvis. Here again the uterine cavity will not necessarily be enlarged, and there is not infrequently considerable displacement of the bladder. By the recto-vaginal examination the displaced adnexa may be felt, and the limits of the effusion, as well as its relation to the uterus, determined.

Pelvic Tumours.—In the instance of pelvic tumours, occurring either in the space of Douglas, the rectum, vagina, or bladder, the cervix uteri and os are normal in size and to the touch, but the cervix is displaced proportionately to the size, position, and direction of growth of the tumour, leaving it still movable and the uterus easily disassociated from it by the bi-manual examination.

For further hints in the differentiation of pelvic tumours from conditions in which there may be ascent of the uterus, see chapter on 'First Steps in Examination,' and those on the diagnosis of the fibro-myomata and ovarian cystoma.

CHAPTER XIII.

UTERINE DISPLACEMENTS (continued).

INVERSION OF THE UTERUS.

By inversion of the uterus we simply mean a turning of the uterus inside out. It is partial or complete, acute or chronic. There are two stages of partial inversion (Crosse): (1) *depression*, (2) *introversion*. The fundus is received into the cavity of the uterus, ultimately reaching to the os uteri; the intruding fundus is grasped by the uterus, and the process of intussusception is continued until the extrusion of the fundus from the os uteri occurs. Once this has happened, the protrusion of the fundus and body of the uterus from the os uteri may continue until the cervix and lips of the os uteri itself are inverted.

Inversion may be met with in practice either as a sudden occurrence or as a chronic condition. The former accident is more fully discussed in works on 'Midwifery.'

The essential—as it always is the predisposing element—in inversion is an atonic state of the uterine parenchyma, favouring relaxation of the muscular fibres. This leads to partial prolapse of a portion of the uterine wall, and is associated with an irregular contraction of the surrounding muscular tissue. The prolapsed portion is treated by the uterus as a foreign body, like a piece of placenta, or the hand; it excites contractions which end in expulsion of a part or the whole of the fundus. This view (Rokitansky) is not inconsistent with the possible and occasional origin of the inversion at the cervix uteri (Taylor and Klob), which latter is inverted and protrudes into the vagina.

Causes.—Atony of the uterus, in whole or part, is produced by (1) parturition, (2) tumours and polypi, (3) placental adhesions, (4) hæmorrhage. The process of traction of the uterine wall is associated with the first three of these; hæmorrhage is a consequence

of all three. If there be general relaxation of the uterus, such an exciting cause as any violent exertion, or severe coughing, might be sufficient to produce a slight inversion or depression, and give the first impetus to the morbid process. It would appear that inversion of the virgin uterus may take place (Puzos, Boyer, Baudelocque, Langenbeck). Goodell believes that ectropion of the cervical mucosa may occasionally follow the general relaxation consequent

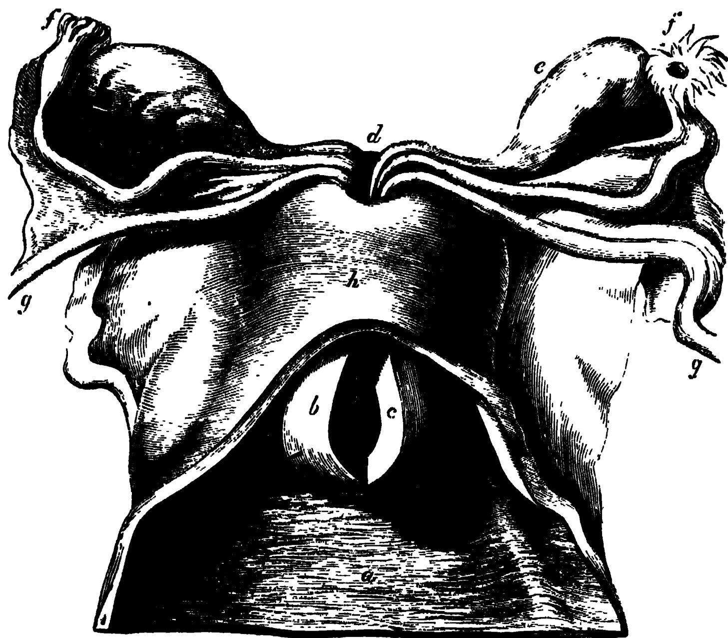


FIG. 263.—INVERSION OF THE UTERUS. *a*, vagina; *b* and *c*, inverted uterus incised to show the cavity; *e*, *f*, *g*, ovaries, Fallopian tubes, and round ligaments; *h*, cervix covered by peritoneum. Two-thirds size, after Crosse, in Musée Dupuytren. (Robert Barnes.)

upon sterility, and masturbation in young girls, and thus start the inversion process.

Aveling thus classified inversion:

Automatic or Fundal	Result of inherent muscular contraction. Placental —tumour.
Systemic (generally Cervical).	Result of extraneous abdominal and respiratory muscular contractions when there is inertia of the body and relaxation of the os.

Mechanical (Propulsive or Extractive).	Result of blows; manual compression; abdominal pressure from viscera or fluid or gas; traction exercised on or by cord or tumour.

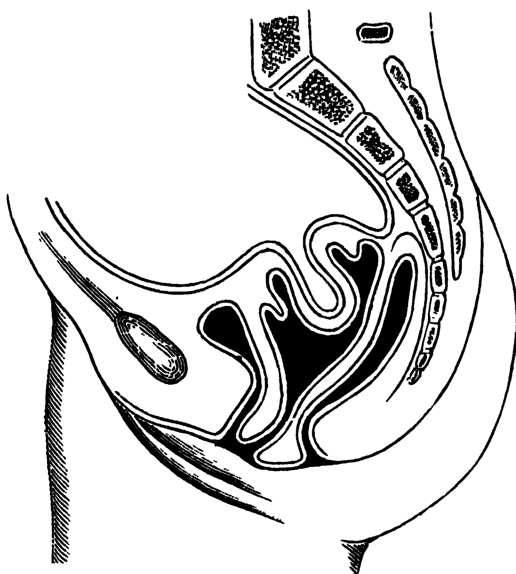


FIG. 264.—PARTIAL INVERSION OF UTERUS, SECOND DEGREE. (Bonnet and Petit.)

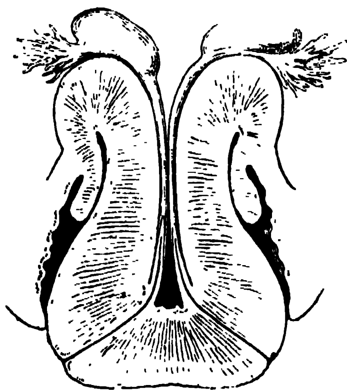


FIG. 265.—INVERTED UTERUS. (Doyen.)



FIG. 266.—PROLAPSUS UTERUS. (Schroeder.)

Signs and Symptoms.—These are: the presence of a tumour, generally not voluminous, felt in the vagina, simulating polypus, attended frequently with hæmorrhage, either constant or periodical; bearing-down pains; pain occasionally in walking; perhaps rectal and vesical distress. Anæmia is a common attendant, from the associated loss of blood and general debility.

Differential Diagnosis.—The main proofs we rely cn that a tumour in the vagina is an inverted uterus are: (1) the presence of a soft, readily bleeding and sensitive tumour; (2) the absence of the uterus from its position in the pelvis; (3) the absence of the normal uterine opening, and the impossibility of passing the uterine sound farther than the neck: the finger feels the cervix at the summit of the tumour, perhaps thinned out to a ring.

In Complete Inversion.—We examine a case of suspected inversion, differentiating it from polypus or procidentia; in the instance of partial inversion, for intra-uterine fibroid. Having made a careful digital examination of the size and consistence of the tumour, we explore it through the rectum and detect the absence of the uterus. By conjoined examination we confirm this. We take the uterine sound, and find it arrested at the neck of the uterus, round which we sweep it: it may pass just inside the cervix for the extent of an inch or an inch and a half. The sound is now passed into the bladder, and the finger into the rectum, and by the recto-vesical examination the fact that the uterus is absent may be ascertained.

In Partial Inversion.—This is much more difficult to diagnose. The trouble is to distinguish it from an intra-uterine fibroid. By

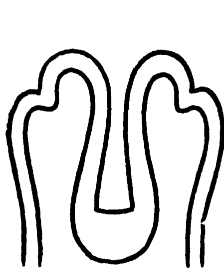


FIG. 267.—OUTLINE DIAGRAM OF COMPLETE INVERSION.

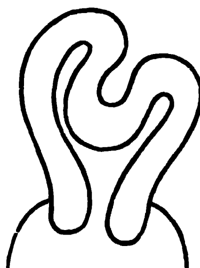


FIG. 268.—OUTLINE DIAGRAM OF PARTIAL INVERSION.

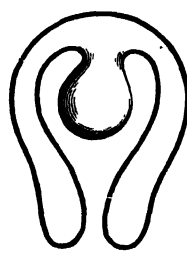


FIG. 269.—OUTLINE DIAGRAM OF POLYPUS AT SUMMIT OF UTERINE CAVITY.

the conjoined examination we may detect the absence of the fundus. On passing the sound, it is arrested by the prolapsed portion of the

uterus, which is sensitive. In the fibroid growth the uterus is enlarged, and the sound passes farther than in the normal uterus, while the tumour is painless. The history of the two is different; the fibroid growth is slow—there is no relation to parturition. Inversion occurs, as a rule, suddenly, and the uterus is sensitive.

Prognosis.—The prognosis must be always grave. Even admitting, says Thomas, the undoubted authenticity of the cases reported, spontaneous reduction must be regarded only as a curiosity, and not as a process to be anticipated. The patient may be worn out with pain and exhausted by hæmorrhage.

Treatment.—This may be briefly considered under three heads: (*a*) palliative; (*b*) taxis and pressure; (*c*) amputation.

Palliative.—Strong astringent preparations of alum, tannin, perchloride and persulphate of iron, matico, hamamelis; daily injections of very hot water; ergot given internally. Aran, in very bad cases where amputation was indicated, used the Paquelin cautery, or potassa cum calce, to the surface of the mass. In this manner the course of nature, when the uterine mucous membrane thickens and becomes like skin, is imitated. The patient lives on without much pain or inconvenience.

Taxis and Pressure.—This must in very old cases be assisted by the local application of cocaine, in the form of ointment and suppository. The vagina is previously dilated by hydrostatic bags, and possibly two or three small and superficial longitudinal incisions through the tissue of the cervical ring. But the great danger of the employment of force has to be remembered; the vagina may be ruptured, or fatal peritonitis result. 'A small hand,' says Thomas, 'a cautious, unexcitable mind, and constant vigilance, during all the efforts by taxis, must be combined with thorough knowledge of the subject.' 'I confess that I should prefer to trust a patient in whom I felt great interest rather to the operation of abdominal section (for the reduction of the tumour), than to that of prolonged taxis at the hands of a rough, unintelligent and inexperienced surgeon.' If this be his deliberate opinion, after a personal experience of nine cases of inversion, it is not necessary to dwell on the care and caution with which attempts at reduction of the chronically inverted uterus must be made.

The ordinary practitioner is not likely to attempt this operation without mature consideration and careful consultation. The principal obstacle to be overcome is the constriction of the cervical ring, through which has to be returned the enlarged and hardened

uterine body. I shall only refer here to two modes of manipulation. Few surgeons would attempt the bold step of Thomas, viz., abdominal section, in order to dilate the cervix from the peritoneal side with a sort of steel glove-stretcher. In fact, in practice it would be far better to trust to continuous pressure than run the risk of any dangerous force or prolonged manipulation. Before an attempt at reduction be made, the rectum and bladder should be emptied, and an anæsthetic administered. The nails of the operator's hands are carefully pared, and the operating hand is well oiled. One hand must be laid on the abdomen, over the situation of the ring of the opposing cervix. With this counter-pressure is maintained against the hand operating in the vagina. The axiom so strongly insisted on by the late McClintock of Dublin is to be remembered, of returning first the part which has inverted last. Emmet's plan is then adopted. The patient is placed in the lithotomy position; the inverted uterus is grasped between the finger and thumb of the right hand; the fingers of the left hand maintain steady counter-pressure on the abdomen. The inverted fundus is pushed steadily upwards with the right hand, while the fingers are used to dilate the cervix. If the case be comparatively recent, the plan of dimpling the fundus with the fingers, and forcing the indented wedge thus formed into the cervical ring, and so overcoming the resistance, may be tried. Repositors of different kinds have been used. Fig. 271 shows the cup-repositor of White. The cup is steadied with the right hand against the fundus, and the force is applied by means of a spiral spring, which the operator presses against the chest, counter-pressure being maintained by the left hand over the cervix on the abdomen.



FIG. 270.—REDUCTION OF INVERTED UTERUS. (Emmet.)

Pressure.—If from the duration of the case, or from the experience of moderate manual efforts at reduction, we deem it inadvisable to proceed with the taxis, it is better at once to try continuous elastic pressure. Aveling, Robert Barnes, and Braxton Hicks were prominent advocates for continuous pressure. The stem and cup of the former may be used for the purpose. The curved stem has at one extremity a cup-shaped disc of rubber, or a hollow cup of

caoutchouc. The other end of the stem has four strong rubber bands, attached to the abdominal belts, which serve to maintain the pressure on the fundus. By tightening the back or front bands, the direction of the pressure is changed. Counter-pressure is secured by an abdominal pad placed under a broad flannel roller. The position of the cup and the direction of the stem are watched from day to day. It is well to carefully pack the vagina, round the inverted uterus, and also the cup when applied, with a tampon of antiseptic wool soaked in oil. Robert Barnes advises periodical attempts at reduction with the hand, under chloroform, when the cup is removed. Should the continuous pressure give rise to pain, or should there be any sloughing, it must be relaxed, and an interval of rest permitted. Its tolerance may be assisted by the administration of bromide of potassium and chloral. The application should be made between the menstrual periods. Should a tumour complicate, or be the cause of, an inversion, we must remove it, and then endeavour to rectify this.

Noeggerath's method consists in the indentation of one corner first, assisted by counter-pressure over the ring of inversion from above the pubes.

As regards the time after the occurrence of the inversion at which successful reposition may be attempted, this varies, Aveling's opinion being that every case of chronic inversion of the uterus is curable.

Fancourt Barnes recorded a case of inversion of the uterus, of four months' standing, successfully restored in eight hours by means of Aveling's repositor.

Jaggard has recorded a case of twenty months' standing reduced, after thirty-three days, by colpeurysis.

Aveling has treated and cured eleven cases of chronic inversion by his sigmoid repositor. Each case took on an average 40 hours for its cure—the longest time occupied being 54½ hours, and the shortest 9 hours. The following are Aveling's instructions for its use :—

Directions for using the Sigmoid Repositor.

'Having diagnosed inversion, determine by touch the size of the fundus, and select a cup of proportionate size. It should be in diameter slightly less than that of the fundus. Next apply the belt round the waist, and then the braces over the shoulders, and fasten them by safety-pins to the belt. This should be done in such a way as to leave room to pass the tapes, to which the rings are attached, between the pin of the safety-pin and the belt. Now the cup of the repositor should be applied to the fundus uteri, and held

firmly in position by an assistant while the rings are adjusted, two being taken in front and two behind. The ends of the tapes should next be passed between the safety-pins and the belt, parts of the tapes drawn through, and a knot made at the ends to prevent them slipping back. Tension may be lastly exerted by drawing the tapes up through the pins and fastening them at any point by tying a loop. This loop can be easily pulled out and retied, should more or less tension be required. Care must be taken to have the tension equally distributed; for if the front bands be tigher than the back, there arises the risk of the cup being slipped back off the fundus; and the opposite may occur if the posterior bands be tighter than the front. The indiarubber bands passing to the front should be carefully laid outside the labia and packed with cotton-wool. If the patient be restless or complain of

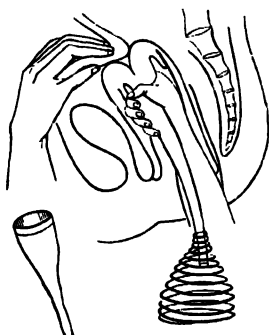


Fig. 271.—White's Cup Repositor. (Thomas.)

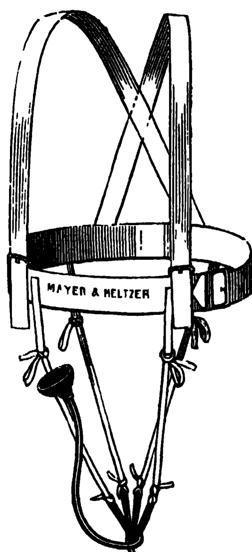


Fig. 272.—Sigmoid Repositor.

pain, morphia may be administered. She should be carefully watched, and the urine drawn by catheter when necessary. It is difficult to lay down any rule for tightening and loosening the tapes. This will be determined by the practitioner, who must judge by the existing tension, and the tolerance of it by the patient. In my last case, re-inversion was accomplished without the tapes being touched after their first adjustment.

Reduction takes place by the cervical method. Pressing on the fundus causes counter vaginal traction on the cervix, making it unroll gradually until the inner os is reached, where a little delay is caused by its being less dilatable. When this point is passed, the body of the uterus soon opens, and admits the cup. The last step must occur rather suddenly, for all patients say they feel that something has "given way," and comparative comfort is the result.

'When the inversion has been reduced, the sooner the cup is withdrawn the better, for the cervix immediately begins to close round the metal stem, and the cup becomes firmly grasped in the uterine cavity. The easiest way of removing the cup is to tilt it on end, and bring it through the os as you would a button through a button-hole. If it should have been long retained, an anæsthetic will assist. When the cup has been removed, pass a thick sound into the uterus, and, by pressing the point of it forward, the rounded fundus will be felt through the abdominal walls. Being satisfied that complete re-inversion has taken place, syringe out the uterine cavity with iodine water at 120° Fahr., which will cleanse its surface and make the whole organ contract.'

'I think,' said Aveling, 'after considering these facts, you will come to the conclusion that every case of chronic inversion of the uterus can be cured by sustained elastic pressure exercised in the right direction; and I hope you will not think me too sanguine when I state my belief that the mutilation of a woman, by removing

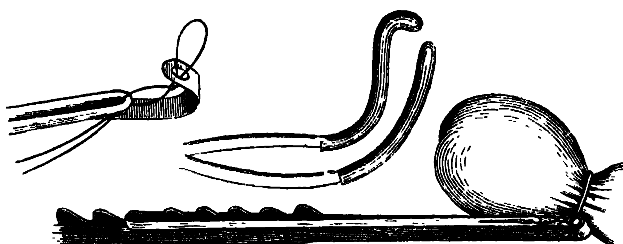


Fig. 273.—Périer's Appliance for Amputation by Elastic Traction. (Bonnet and Petit.)

her uterus, will no longer be necessary in consequence of the impossibility of replacing this important organ when inverted.'

Amputation.—I do not enter into the various arguments with regard to amputation. I would wish, however, to quote the view of Emmet in regard to this *dérnier ressort* for inverted uterus. Having discussed the chances of success by various methods of reduction, he says: 'With our present knowledge, I would not advocate the operation unless the life of the patient was in jeopardy, and the choice rested between it and amputation.' The older modes of operating included the application of an elastic ligature, galvano-cautery wire, écraseur, or scissors.

Amputation by elastic ligature (Périer) is now performed by clasping the uterus high up with an encircling forceps covered with rubber, with which it is drawn well down to complete the inversion (Fig. 273). The fundus is next surrounded with a loop of strong silk below the claws of the forceps,

and the ends of the ligature are included in the eye of a long, cog-handled stem, which is so constructed that, by means of the cogs in the handle, it tightens the ligature firmly, which is secured by a double knot. By the same silk thread a ring of elastic rubber is adjusted against this constricting loop of silk with another triple knot. The elastic ligature is finally stretched on the cog of the stem, and the uterus is restored to its position in the vagina. The ligature is tightened from time to time, and the uterus separates from the ninth to the fourteenth day. Most careful antiseptic precautions are taken during this interval, and the pain, which is sometimes very severe, is relieved by injections of morphia. Kaltenbach secures the fundus by ligatures of silk and elastic, and cuts off the portion of the uterus below these.

Vaginal Amputation of the Uterus.—The surface of the tumour and the vagina having been thoroughly cleansed, the uterus is drawn well down, and the neck of the sac is brought well within reach. Two flaps are cut, beginning at the neck of the inverted uterus, anterior and posterior. Three or four strong gut or silk ligatures are then carried through the stump from before backwards before the peritoneum is opened in front. The peritoneal opening is enlarged, and the uterine vessels are secured at either side. The uterine ligatures serve to prevent the inversion of the stump. These are finally tied, and the flaps carefully approximated. The vagina is dressed in the usual manner, and the ligatures can be removed in from ten to twelve days.

Pan-Hysterectomy.—Vaginal pan-hysterectomy may be performed much in the usual manner, care being taken not to injure the bladder, which is not contained in the sac as is frequently the case in prolapse.

Küstner's Operation.—The following are the steps of this mode of reposition:—The pouch of Douglas is opened transversely. The finger is carried through the opening into the inverted uterine sac, and any adhesions are separated. A longitudinal incision is now made through the posterior wall of the uterus in the middle line, from two centimetres below the inverted fundus to two centimetres above the external os, right down to the peritoneum. The uterus is next re-inverted by the aid of the index finger in the pouch of Douglas, steadying the funnel, and with the thumb pressure is made on the fundus at the same time. The uterine incision is closed by two layers of sutures, the pouch of Douglas is also closed, and the operation is complete.

Dührssen's Operation.

Dührssen modified Küstner's operation by dividing the peritoneum in front of the uterus, between it and the bladder. Furneaux

Jordan reduced an inverted uterus, which filled the vagina, by this operation, by means of which, he says, it is easier to effect reduction, as it is difficult to reach the pouch of Douglas in these extreme cases.* The operation is as follows :—

The uterus is pressed lightly backwards with the fingers of the left hand, and the vaginal mucous membrane is divided as in colpotomy. The bladder is hooked upwards and forwards by fine vulsellum forceps, and the peritoneum is opened in the usual manner. The index finger is directed to the opening of the cup formed by the inversion. Here is the source of difficulty in replacement. The os and cervix are now divided with scissors in the anterior median line, and the incision may have to be extended considerably along the anterior middle line of the uterus. The reduction is now effected, and the incision is closed with fine silk or gut. A small iodoform drain may be left in the utero-vesical pouch.

Piccoli's Operation.

In 1893 Piccoli of Naples extirpated a uterus for irreducible inversion, though the cervix uteri had been divided, subsequently reducing the inverted fundus by prolonging the incision on the posterior surface for the entire length of the uterine canal as far as the fundus, and at the Congress in Rome in 1894, he formulated an operation, the steps of which are briefly as follows :—

Thorough asepsis having been secured, the uterus is lowered either by an elastic ligature or, as Duret proposes, a Museux' forceps. It is then curetted, and next a transverse incision is made in the cul-de-sac of Douglas, reaching, if necessary, as done by Morisani (who was the first to perform Piccoli's operation in 1896), as far as the sacral ligaments. If reduction cannot now be effected, the entire thickness of the posterior wall of the uterus, from the external os to the fundus, is incised, and reduction is effected by doubling the uterus back upon itself from the incised wall. The mucosa is thus brought inside, and the peritoneal covering outside, while the incised appears in front instead of behind. The incision is then closed, and the uterus is replaced in the abdominal cavity by raising it through the opening in the pouch of Douglas, which is now sutured. If hæmorrhage be uncontrollable, hysterectomy must be performed. Morisani in 1896, and Sava in 1897, performed this

* *Birmingham Medical Review*, Jan., 1897: 'Treatment of Inversion of the Uterus—a New Operation. Furneaux Jordan.'

operation successfully, and so did Duret of Paris. Piccoli's operation is an improvement on that of Küstner, the steps of which we have detailed above.

Reduction by Continuous Elastic Pressure and Imprisonment of the Cup.

An interesting case of the cure of inversion by continuous elastic pressure after Tait's method is recorded by Dr. Mackay of Huelva, but during the application of the pressure in his absence the cup followed the retreating fundus, and was incarcerated in the uterus. Efforts at extraction proving futile, it was delivered by incision of the posterior lip of the cervix, and the woman made an excellent recovery.

CHAPTER XIV.

UTERINE REFLEXES.*

A FEW observations on the subject of uterine reflexes may not be out of place now that we have considered those conditions which are mainly associated with such reflex disturbances.

The connections between the vagina, uterus, and ovaries, through their nervous supplies, with the splanchnic nerves, and with the spinal cord in the sacral and lumbar regions, through the pelvic and hypogastric plexuses, anatomically explain many of the reflex phenomena that follow upon stimulation or irritation of the ovarian and uterine nerves consequent upon disease in the ovaries or uterus.

The reflex connection between the mammary gland and the uterus, and between the sciatic nerve and the uterus, shows that this reflex association is established between the uterus and such a distant part as the nipple, and with peripheral nerve-trunks, as those of the sciatic. And in whatever light we look upon ovulation, or the part played in it by the uterus and Fallopian tubes, and the various physiological effects brought about by it on the entire being of the woman, the consequences which follow a deviation or interruption of that process are but constantly recurring demonstrations of the physiological effects produced under its influence in almost every organ in her body.

As examples of this, we may take the occurrence of varying shades of optic neuritis and retinal irritation in connection with suppression or irregularity of the catamenia; neuralgic pains in the eyeball associated with the menstrual epoch, neuralgia of the supra and infra orbital nerves, slight epileptiform seizures of the facial muscles, toothache and dental neuralgia,† laryngeal migraine and functional aphonia, or paresis of the intra-laryngeal muscles, milder forms of hypertrophic rhinitis, and similarly, tinnitus aurium and

* Since this chapter was first written, another interesting paper has been read before the Gynæcological Society, on the same subject, by Dr. Mendes de Leon, of Amsterdam.—*Brit. Gyn. Inst.*, August, 1899.

† See p. 202.

vertigo, sympathetic neuralgia and temporary congestion of the mamma. As consequences of menstrual irregularities, we find irritation of the dorsal and lumbar painful spinal zones, herpetic eruptions of the skin, functional irregularity of the cardiac rhythm, gastralgia and nausea, slight icteric attacks, atonic or irritable states of the intestines, irritation of the bladder, with increased frequency of micturition, pains in the branches of the lumbar and sacral nerves; varieties of headache, and severe hemicrania. All such symptoms may be accounted for by reflex vaso-dilating or vaso-contracting effects produced by irritation arising in the uterus or ovaries, as the result of arrested or imperfectly discharged physiological processes.

The ready response of the uterus to such stimuli as an anæmic blood current, or one in which there is an excess of carbonic acid, is an established physiological fact, and the influence of such reflex impressions as are conveyed by a cold hand on the abdomen, or friction of the mammary gland, has been obstetrically availed of from early times. How readily its catamenial functions are disturbed by such causes as mental or physical shock, cold and heat, we are all familiar with. So it must happen that an organ so susceptible to any direct or reflected stimuli will, in the many varying states of a woman's health, or the accidental occurrences of her daily life, respond quickly to these influences. The physiological pain, and the much-debated 'spasm' of dysmenorrhœa, having no apparent cause in ovary or uterus, but for which we find a ready explanation in an anæmic or toxæmic blood-supply, as the cause of those contractions or 'spasms' that attend on the 'obstructive' form of dysmenorrhœa, are thus explained. It undoubtedly *is* true, as insisted on by Clifford Allbutt, that the ill-health of the woman is the cause of the ill-health of the uterus in many cases. It is equally true that the ill-health of the uterus or ovary is frequently the first step in the general deteriorating process, and as it originates, so it maintains it. All we know of the physiology of uterine action compels us to regard the uterus and ovaries as the strongest links in the chain of the woman's health of mind and body. Weaken them as you may from without or within, and you immediately, but fundamentally, touch all the mainsprings of her life.

There has not been one of these functional disturbances that I have not from time to time seen and treated, in which the association with disorders of menstruation was not clearly to be traced. And if this be so in the instance of aberrant physiological functions, how much more likely are we to have such consequences following

gross pathological changes in the uterus and appendages. And this we find to be practically the case.

In prolonged disorders of the uterus, resulting in enlargement, hyperplastic deposits, or a process of fibrosis following on arrested involution, in those secondary pathological conditions attending upon lacerations of the cervix, in deep erosions, in unrelieved versions and flexions, in tubal enlargements and displacements, and in chronic affections of the ovary, as sequelæ of pregnancy, we find not only these reflex conditions present, but more aggravated pathological consequences and more serious disturbances of function. We have this association exemplified in the eye in the results of thrombosis or embolism, as retinal infarctions or extravasations with their secondary consequences—atrophy and partial or complete loss of vision; in the nose, in epistaxis, chronic nasal catarrhal states and perversions of smell; in the ear, in labyrinthic apoplexy, with all the symptoms characteristic of Ménière's disease, vertigo and deafness. We see the same connection in the brain, in hallucinations of smell and taste, illusions and delusions, from slight erraticisms in mental action to complete perversion of the mental faculties, as in climacteric mania, and in the nervous system generally, in such evidences of instability as aggravated hysteria, neuralgia, hystero-epilepsy, and epilepsy. In the skin these manifestations are shown in such nerve disturbances as prurigo and herpes, or in the appearance of acne or eczema. The occurrence of nervous alopecia, and the aggravation periodically of any chronic disorder—as, for instance, psoriasis and erythematous lupus—are not infrequent results of menstrual disorders. I have already referred to menstrual ulcer and pigmentary changes. In the heart, irritability in action and hæmic murmurs—conditions which frequently lead to a permanent hypertrophic state, or are felt through attacks of syncope, with evidences of low vascular tension generally, as shown by an habitually compressible pulse—are common.

We find in the stomach gastric irritation, with possible congestive changes which may lead up to gastric ulcer. There are atonic states of the bowel which tend to constipation on the one hand, or on the other to diarrhœa, while disordered sexual function and perimetric inflammation frequently lead to congested conditions of the rectum, complicate hæmorrhoids, and are apt to produce that irritability of the sphincters so conducive to costiveness.

The important bearing of uterine affections on diseases of the rectum, and on operative interference for these, in preventing, as

long as they are unrelieved, a successful issue from the latter, is well known to any one who has had experience in rectal affections. Hence, in a great number of cases, the necessity imposed of delaying operation until the uterine affection has been rectified.

Apart from these more direct consequences of pelvic visceral disease, there are those indirect results that follow upon interference generally with metabolic changes in the various viscera, consequent upon abnormal states of the circulatory fluid, and in which defective ovarian or uterine functions react on such states as anæmia and chloræmia, thus altering the normal secreting functions of such organs as the liver and kidneys, and seriously interfering with the metabolic action of the spleen.

Whether such conditions are primary or secondary to the general state of health, dependent upon these interruptions, matters little to us as practical physicians. So long as we recognize the physiological game of battledore and shuttlecock they play in deteriorating the general state of health in the individual, we are bound to recognize and treat them.

It is cruel to a woman to style her 'neurotic,' 'hysterical,' or 'hypochondriacal,' while she suffers from any disease of her pelvic viscera, which does thus accentuate or aggravate the ordinary consequences that attend upon any abnormal constitutional condition. It is something more than injustice to her if we deliberately and complacently ignore the influence that such local disease exerts in exciting morbid impulses in her central nervous system. This danger is none the less because temperament in a woman plays so prominent a part in the predisposition to disease and the susceptibility to pain. We must be careful, however, to keep quite distinct the neurosis associated with disease, from that which is the outcome of temperament, disposition, and habits.

The Neurotic Temperament.—In a paper already referred to, I thus describe two forms of temperament of special interest to the gynæcologist: —

> I must ask your attention for a few minutes to that large class of sufferers from affections of the female generative organs which is commonly spoken of as 'nervous.' The neurotic woman, I take it, is to be regarded in the light of a by-product of that unstable nervous organization which we style the 'nervous temperament,' and it were well to confine our employment of this term 'neurotic' to such abnormal and morbid exaggerations of this temperament as are not uncommonly found associated with pathological conditions of the woman's pelvic viscera. Thus, we can frequently trace the incipiency of the neurosis to the occurrence of some accident or injury, which

may have had a dual consequence through the infliction of shock, or the inducement of some displacement or affection of any one of these organs. Previous to such accidental determinations, the woman may have been normal in the control of her will, feelings, and emotions. Her energy and impulses have directed her actions, without causing that sense of reaction and fatigue which is so constantly present after slight exertion when her impulses are diverted by unhealthy excitations, and her energy is dissipated by morbid introspections. Such a nervous temperament is frequently satisfied with little sleep. Under the influence of excitement, fatigue is quickly recovered from, and a latent reserve force of energy appears ever ready on demand to carry its possessor over insurmountable obstacles. All this accumulated governmental control of will and nerve energy are missing in the neurotic, but none the less is that loss felt when the unequal struggle occurs between the sovereignty of an enfeebled indeterminate will, and the rebellious and more masterful emissaries, the woman's 'lower passions and lower pains.' While in health, such individuals can pass through great physical and mental exertion without stimulants, but when the natural call on their reserve energy finds no response, they apply the artificial spur of alcohol or some other excitant, as morphia, to the flagging nerve-cells. Such women are quite cognizant of the abeyance of the power to exercise free will. The desire to suppress the expression of pain is present, but the usual control is lost. Also, there is general hyperæsthesia of the peripheral nerves, which find in the frequently ill-nourished cells a susceptibility to slight impulses and morbid sensitiveness, with an exaggerated perception of comparatively trifling stimulation. Here we are dealing with an acquired neurosis, for which possibly we may find no clue through atavistic transmission. On the other hand, we can frequently see in early childhood the traits of temperament which clearly foretell the future neurotic woman. Capriciousness, irritability, selfishness, restlessness, and excitability, are among the mental characteristics which stamp the moral prototype in the child of the adult neurasthenic and hysterical woman, though it is after puberty that we frequently find such distinctive features of character develop themselves. When a woman of this type marries, in the demands on her nervous system, if she be not sterile, which the claims of children and domestic duties involve her in, she generally escapes those neurotic and hysterical manifestations that are found in the unmarried and sterile. In the single woman of the 'neurotic' type, we are most likely to meet with those erotic thoughts, desires, and practices that still further enervate her nervous system and enfeeble her central control.

Turn we now for a moment to the lymphatic antithesis of this unfortunate victim to morbid nerves and sexual impulses.

There is a type of woman, familiar to us all, indolent, lethargic, fanciful of ailments, with a superficiality bordering on childishness in conversation, dull of comprehension, readily open to flattery, even to her own self a bore, and frequently one to her husband and children if she be married. She is often found fringed with layers of pectoral and abdominal fat, the easy prey to quack systems of dieting, and to the 'man of the world' physician. Her defective metabolism, added to a sexual voluptuousness, makes this proprietary article the registered dual property of the 'pure specialist' for gout

on the one hand, and the cotton-wool gynæcologist on the other. She is one of the principal sources of revenue to the Franc Tireurs of the outposts of medicine—the ubiquitous masseurs or masseuses—as the previously described sufferer is to the fashionable 'Weir Mitchell Home.' With her, every twinge is 'agonizing,' to walk is impossible, and once let her evolve 'uterus and ovary on the brain,' and, whether these organs be diseased or not, they are made responsible for every ill her peccant flesh is heir to. She is not of the classical neurotic type previously described, though her visceral neuroses may in time come to be legion. She may suffer from congestive dysmenorrhœa and ovaralgia, her uterus may be as flabby as her brain, and her ovary be as fertile in aches as her imagination is in fanciful allusions. Her voluptuosity is not limited to her appetites of palate, and it is not infrequently manifested in various sexual abuses. She fancies she sleeps for many hours less than she actually does sleep, and hence is often seeking for some new, when she has already exhausted every conceivable variety of reputed, hypnotic. While we find in the unmarried more frequently examples of the first type of temperament, married women furnish a larger proportion of the latter.

I have tabulated two hundred and seventy cases of disease and abnormal conditions of the sexual organs in women, selecting those cases in which no special functional or organic troubles in any other organ were more particularly complained of, from a total of some five hundred, the notes of which I have perused. I here give a brief analysis of the associated mischiefs which, I believe, in the vast majority of the cases quoted, were secondary to the affections of the sexual organs. I have not included cases in which there were grosser changes, such as large fibroids and ovarian cystoma. The comparative ages of these patients is roughly shown in this table :

Under 20	7
20—30	90
30—40	102
40—50	63
50—53	8
	270

195 married; 75 single.

It is sufficient for my object to cite what I consider to have been the principal abnormal state present in each case :—

	Cases.
Retroversion, with or without flexion	55
Marked anteversion, with flexion	11
Ovarian enlargement, with or without tubal affection	23
Retroversion, with ovarian and tubal complications	11
Subinvolution of uterus	33

	Cases.
Erosion of cervix, with or without endocervicitis	22
Hypertrophic condition of uterus	6
Hypertrophic condition of uterus, with ovarian complications	9
Endometritis, with and without ovarian complications	14
Extensive laceration of cervix	6
Stenosis, with congenital malformation	15
Small fibroid tumours	11
Intra-uterine polypus	2
Sarcoma of uterus	1
Symptoms incidental to menopause	29
A direct sequel to pregnancy	1
Suppression of catamenia	18
Vaginismus	1
Absent perinæum	2
Total	270

Of the entire number quoted, fourteen were not submitted to local examination, and are included under the head of 'Suppression of catamenia.'

We turn now to the symptoms other than uterine or ovarian complained of in the two hundred and seventy cases.

I have included no case of malignant disease save one of sarcoma.

The following is a list of the principal signs and symptoms complained of by the two hundred and seventy patients:—

	Cases.
Anæmia	19
Skin affections (as eczema, erythema, acne, erythematous lupus, alopecia, psoriasis, prurigo)	13
Head symptoms (as aggravated headache, 'fulness in the head,' loss of memory)	53
Facial neuralgia	15
Neurasthenia	45
Migraine	16
Mammary sympathies (as neuralgic pains, glandular changes)	6
Spinal pain and irritation	10
Intercostal neuralgia	25
Numbness of upper extremities	4
Numbness of lower extremities	4
Pain in upper extremities	2
Pain in lower extremities	9
Stiffness in ankles with each period	1
Catalepsy	2
Hysteria	13

	Cases.
Insomnia	15
Epilepsy	3
Tendency to melancholia, depression	9
Dementia	4
Agorophobia	1
Ophthalmic symptoms dependent upon abnormal retinal states (as optic neuritis, pathological changes in papilla, hyperæmia of retina, asthenopia)	15
Nasal symptoms due to turbinate congestion or hypertrophy .	5
Laryngeal symptoms, such as varying degrees of aphonia due to paresis of laryngeal muscles, hyperæmia of vocal cords .	12
Œsophageal spasm	1
Thyroid enlargement	1
Tinnitus aurium	7
Sickness and nausea	5
Gastralgia	15
Dyspepsia	11
Cardiac symptoms (as irregularity of rhythm, intermission, dyspnœa, hæmic bruit)	33
Attacks simulating angina pectoris	1
Abdominal symptoms (as erratic pains, flatus, hepatic engorgement, dysenteric symptoms, diarrhœa)	17
Aggravated constipation	11
Pain and irritability of rectum	4
Vesical symptoms (as irritation, difficulty of retention or pain with micturition, vesical pain)	30
Difficulty of locomotion	24
Impairment of general health	54
Painful sitting	1
Epistaxis	2
Defective circulation—lividity of upper and lower extremities .	2

Space does not allow of any exhaustive reference to, nor any special selection of, the cases here referred to. Under the heading of 'aggravated headache' should be frequently included some such symptoms as those described as 'fulness in head,' 'pressure on head,' 'sense of tightness,' and 'flushings.' Under that of neurasthenia I include those well-known unstable states of the nervous system generally, which embrace various morbid apprehensions, fits of depression, uncertainties of sight and touch, disturbance of sleep, irritability or capriciousness of temper.

Under 'difficulty of locomotion' I have only reckoned those cases in which there was a distinct inability to walk.

By 'impairment of general health' I refer to such general conditions as 'lassitude,' 'feeble circulation,' 'weak cardiac action,'

'alteration in the specific gravity of urine,' 'tendency to syncope,' 'loss of appetite,' and proofs in the complexion and facial expression of great enfeeblement of the system.

I have thus endeavoured to produce some of the evidence which has convinced me of the fact that many distant lesions and remote symptoms are due to, and have their exciting cause in, uterine irritation.

Were I to go back over an equal number of cases of affections peculiar to the ear, the eye, and the nose, I should find that lesions in these organs were occasionally associated with abnormal uterine conditions. I cite these three organs of special sense, as I have accumulated a larger experience of the causes leading up to their ill-health than has been possible for me in the instances of other organs.

The throat and skin have likewise their reflex relationships with the organs of generation in women. The slight elevation of temperature in the skin during the catamenial period is a physiological fact worth remembering.

The alternating and dominating influence exerted by body and mind over each other in maintaining or disturbing that healthful harmony essential to the preservation of a normal balance of power betwixt the two, is, in my opinion, nowhere better exhibited in the organism than by the effects produced in the nervous system of a woman by the ordinary physiological variations in the health of her sexual organs. How far that harmony is influenced by functional or pathological deviations from a healthy state of these organs, is, I think, shown clearly by the list of nervous affections I have just cited.

I wish that every one would 'read, learn, and inwardly digest' these sound and valuable comments of Goodell with regard to that numerous class of women sufferers who, when they come complaining of various troubles, some fleeting, some intangible, some fanciful, others permanent, others visible, and many in no sense exaggerated, are immediately pounced upon as victims to some disorder of the generative organs and functions. They are worthy of the robust mind of that practical and distinguished American gynæcologist:—

'I have learned to unlearn the idea—and this was the hardest task of all—that uterine symptoms are not always present in cases of uterine disease, or that, when present, they necessarily come from the uterine disease. The nerves are mighty mimics, the greatest of mimics, and cheat us by their

realistic personations of organic disease, and especially of uterine disease. Hence it is that seemingly urgent uterine symptoms may be merely nerve-counterfeits of uterine disease. I have, therefore, long since given up the belief, which with many amounts to a creed, that the womb is at the bottom of nearly every female ailment.

'Nerve-strain, or nerve-exhaustion, comes largely from the frets, the griefs, the worries, the carks and cares of life. Yet although the imagination undoubtedly affects it, it is not a mere whim or an imaginary disease, as all healthy women and most physicians think; but it is the veriest of realities. When some flippant talker or some slipshod thinker scoffs at nervousness as a sham disorder, I say to him: "Can the bribe of a principality keep you from blushing when you are ashamed, or from blanching when you are afraid?" Under the fitting sense of shame or fear, these vaso-motor disturbances are momentarily beyond your control; and so they are in the nervous woman, whose vital organs are, as it were—not transiently, but—perpetually blushing and blanching under deficient brain-control over the lower nerve-centres.'

'Strangely enough, the most common symptoms of nerve-disorder in women are the very ones which lay tradition and empiricism attribute to womb-disease. They are, in the order of their frequency, great weariness, and more or less of nervousness and wakefulness; inability to walk any distance, and a bearing-down feeling; headache, napeache, and backache; scant, painful, delayed, or suppressed menstruation; cold feet, and an irritable bladder; general spinal and pelvic soreness, and pain in one ovary (usually the left), or in both ovaries. The sense of exhaustion is a remarkable one; the woman is always tired; she passes the day tired, she goes to bed tired, and she wakes up tired—often, indeed, more tired than when she fell asleep.

'She sighs a great deal, she has low spirits, and her arms and legs become numb so frequently that she fears palsy or paralysis. There are many other symptoms of nerve-strain, but since they are not so distinctly uterine, and therefore not so misleading, I shall not enumerate them.

'Now, let a nervous woman with some of the foregoing group of symptoms recount them to a female friend, and she will be told that she has a womb-disease. Let her consult a physician, and ten to one he will think the same thing, and diligently hunt for some uterine lesion. If one be found, no matter how trifling, he will attach to it undue importance, and treat it heroically as the peccant organ. If no visible disease of the sexual organs be discoverable, he will lay the blame on the invisible endometrium or on the unseeable ovaries, and continue the local treatment. In any event, whatever the inlook or the outlook, a local treatment is bound to be the issue.'

CHAPTER XV.

INFLAMMATION OF THE UTERINE TISSUES—ACUTE AND CHRONIC.

HYPERÆMIA (active and passive).
Acute—Metritis and Endometritis (cervical and corporeal).
Septic Gonorrhœa.

Chronic—(*a*) Endometritis (cervical and corporeal).
(*b*) Chronic Hyperplasia (syn. Chronic Parenchymatous Metritis).
(*c*) Subinvolution.
(*d*) Catarrhal Inflammation of Cervix.
(*e*) Granular Degeneration of Cervix.

This is a simple clinical classification, and appears to me the best that can, for clinical purposes, be placed before the student. The pathological sources of metritis have to be remembered, and these are mentioned incidentally in treating of the causation of the various acute and chronic forms of inflammation of the cervical and corporeal canal. We find such primary causes of metritis in—

(1) *Puerperal septic processes*, initiated by pathogenic organisms (pyogenes and saprophytes); chronic mucopurulent discharges associated with similar germs (streptococcus and staphylococcus); traumatic inflammatory processes which follow on wounds of the cervix, lacerations, etc.

(2) *Gonorrhœal inflammation*, caused by the contact of gonorrhœal virus (gonococcus)—merismopedia gonorrhœa.

(3) *Tubercular inflammation*, tubercle bacillus with or without evidences of tubercle elsewhere in the body; rare in the uterus and Fallopian tubes. Menstruation is occasionally absent.

(4) *Syphilis and syphilitic new growths;* secondary deposits; degeneration in the parenchyma or mucous membrane.

HYPERÆMIA.—The vascular system of the uterus is subject to considerable fluctuations in its blood-supply. This we would

expect, not alone from its anatomical peculiarities in the distribution of the uterine vessels and the erectile muscular tissue which surrounds them, but also from the influences to which the uterus is subject periodically, such as menstruation, coitus, ovarian excitement, morbid growths, displacements, peri-uterine inflammations. Nor can we ignore, in the uterus as elsewhere, the influence exerted on the arteries by reflex stimuli. Hardly otherwise can we account for inflammatory mischief arising from some slight exposure to cold, or, in some instances, from the careful passage of the uterine sound and the uterine disturbance that follows mental shock.

Symptoms and Physical Signs.—Such sensitiveness and tenderness are present in these cases as we might anticipate would be from a slightly swollen and turgid womb. Perhaps there is an exaggeration of the natural secretion, and a tendency to excessive menstrual flux, or some occasional irregularity of the periods, and metrorrhagia. On examination we may detect a congenital defect, predisposing to stenosis and dysmenorrhœa, or a uterine displacement, or small fibroid. The patient complains of pain in the back, and about the pelvis, and inability to walk much or to stand. Very often the sufferers are women who have to stand a great deal, or are occupied in some sedentary work. They may suffer at the same time from dyspeptic symptoms. Coincidentally we may discover cardiac or renal mischief, functional cardiac murmurs, and find the urine of low specific gravity.

Treatment.—Under this head I include general hygienic measures; such rest as can be obtained; avoidance of coitus; change of air; the warm vaginal douche; local depletion; the use of Kreuznach and Kissingen waters; the water and baths of Kreuznach and Woodhall Spa, in Lincolnshire; the bromides of potassium and ammonia; the combination, already recommended, of ergotine, quinine, and lupuline; the glycerine tampon, worn at night, or an ichthyol and glycerine tampon (5 per cent.); and the extract of hydrastis canadensis, both given internally and applied as a tampon. Alkaline and iodised baths are of service, taken with a bath speculum. The bowels are regulated by proper aperients, the saline waters, and occasional enemata.

Passive Hyperæmia.—If we do not see the case in the earlier stage of hyperæmia, there is very often a protracted history, and the general health has been for some time affected. The causes enumerated in bringing about active hyperæmia continue in

operation. It is this condition of uterus which, when persistent, leads to general hypertrophy of the uterine tissues, and even to chronic hyperplasia. The same indications for treatment exist as in the active state. We must endeavour to correct any general or constitutional fault, while we control local congestion and subdue irritation.

Acute Metritis and Endometritis.—For clinical purposes we may define this state as that of acute inflammation of the uterine parenchyma and the mucous membrane of the uterine canal. While we cannot separate pathologically the inflammation which attacks the muscular tissue of the uterus and its peritoneal covering from that which involves its mucous membrane, both being very generally associated and intercurrent, still, this division into acute and chronic metritis and endometritis is an old practical distinction, which for clinical purposes it is as well to preserve. Most frequently the inflammation commences in the endometrium, and spreads to the muscular structure and cellular elements. On the other hand, the attack may begin in the peri-uterine cellular tissue, or the abdominal or uterine peritoneum. In such a manual as this it is better to take these associated conditions together, and discuss them at the same time.

Causation.—This will be traced to wounds; injury; any shocks transmitted to the uterus; operations; cold caught during a menstrual period; gonorrhœal infection; septic infection; intra-uterine medication; the use of stem-pessaries or the uterine sound; vaginitis.

Symptoms and Physical Signs.—Rigors; high temperature; pain and tenderness in the hypogastric region; sense of fulness in the vagina, accompanied by heat and sensitiveness; absence of the vaginal secretion; viscid discharge from the uterus, changing to purulent—this discharge is at times acrid and irritating to the skin of the vulva. On digital examination the uterus is found enlarged and very sensitive; the lips of the os uteri have a tendency to gape. With the speculum the cervix and os uteri appear swollen and œdematous; the latter may be blocked with discharge, which varies in its nature according to the cause of the metritis.

Septic metritis—in its marked preliminary pyrexial symptoms, the great pain, the accompanying peritoneal mischief, and the history of a definite cause, as a recent operation, injury, or septic contagion—is not likely, with the exercise of care, to be

confounded with any other affection. The approach of pelvic or general peritonitis is marked by varying degrees of immobility of the uterus, abdominal tenderness, and tympanites. *I may say that I do not believe in any such affection as uncomplicated metritis.* I have never seen a case of metritis run its course without some degree of pelvic peritonitis, perimetritis, salpingitis, or endometritis accompanying it.

Diagnosis.—If with the foregoing symptoms we find, by digital examination and the bimanual method, that the uterus is enlarged and sensitive, while the vagina is hot or swollen, we can have no doubt of the nature of the affection.

Prognosis.—This must always be cautiously expressed; much will depend on the exciting cause of the inflammation and the stage at which we see it. Should the inflammation end in abscess, peritonitis, or septicæmia, the issue may prove rapidly fatal. On the other hand, if the inflammation should remain localized, and yield to active treatment, it may terminate in a few days, or it may pass into a chronic form, leaving the patient with an enlarged (parenchymatous) uterus and chronic endometritis. It is well-nigh impossible to diagnose a metritic abscess. It is necessary to insist on the danger of using the uterine sound in any case of acute inflammation of the uterus or its peritoneal connections.

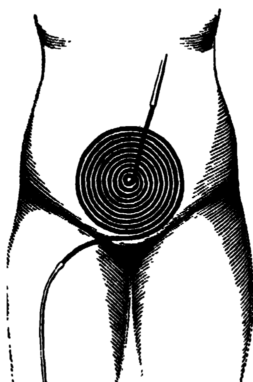


FIG. 274.—LEITER'S TEMPERATURE COIL.

Treatment.—In acute septic metritis warm compresses should be used, and spongiopiline, sprinkled with laudanum and belladonna, applied over the uterus; leeches may be applied (eight to twelve) over the hypogastric region, close to the pubes. A thin linseed poultice, covered with oiled silk, or a mild turpentine and laudanum application is laid over the lower part of the abdomen, if there be tympanites. A lanolated cream of oleate of mercury and morphia (5 per cent.) with extract of belladonna, spread on a piece of linen, and laid on the abdomen, under the moist compress or spongiopiline, will be found of use. A Leiter's temperature-regulator may be placed over the pubes (Fig. 274). Aveling's coil of the same tubing, fitting into a cup and stem, and which can be worn in the vagina, is an ingenious application of Leiter's plan. The

medicines we rely on are opium, half-grain to one-grain doses every third or fourth hour; quinine, in doses of three grains every third hour, either alone or combined with the opium. If there be high temperature, then a few doses of ten to twenty grains generally reduce it, if the patient can tolerate these, or Warburg's tincture. Phenacetin or antipyrin can be tried for elevation of temperature, and be repeated as the temperature indicates. The patient must be fed on liquid nourishment, such as milk, chicken-broth, and beef-tea. Alcohol should be administered according to the patient's strength, and its effects on the pulse and tongue watched. In the mean time, the vagina is washed out occasionally with a warm douche of perchloride of mercury solution (1 in 5000) at a temperature of 100° to 110°.

Curettage.

Such authorities as Walton, Doléris, Gottschalk, Petit, and most of the American authorities, advocate dilatation, curettage, and drainage in metritis. By these steps the uterine isthmus is enlarged and freed from obstruction, the flow between the Fallopian tube and uterus is increased, muscular contractility in the tube and uterus is excited, congestion of the pelvic organs is lessened, and local sterilization of the uterine cavity by antisepsis is permitted. The decision to curette the uterus will depend in great part on the nature of the inflammation. If it be septic, if the metritis be due to intra-uterine causes, such as fungus endometritis, chronic purulent endometritis, retained products of conception, intra-uterine growths, or remains of operative interferences, it is my practice to curette in the manner already described, and I have never had any cause to regret my decision.*

The arrest of septic dissemination and absorption are thus secured. The safety of future operative procedures on the adnexa is increased. 'A primary cœliotomy when curettage is indicated in a case of acute salpingitis and peritonitis,' says the writer in Baldy's 'System of Gynæcology,' 'stamps a man as blind to reason and to the work of other men, and as willing to open a fellow-being's abdomen rashly and unnecessarily.' The practice of the gynæcology of to-day, in all cases of septic peritonitis, puerperal and other, is to discountenance the old methods of inaction, and to encourage the plan of timely local treatment of the source of the infection in the uterine endometrium by curettage.

In all cases of acute uterine inflammation, the administration of a saline, in the early stages, is of service. Liquor ammoniæ acetatis,

* See pp. 169–175, for the Operation and Dangers of Curettage.

with sweet spirits of nitre; bicarbonate and citrate of potash; the saline mixture of sulphate of magnesia in infusion of roses, are perhaps the simplest and most useful. If the bowel be costive and the tongue coated, the administration of a few grains of calomel at bedtime, followed by a saline aperient in the morning, will benefit.

If the metritis should supervene on operative treatment, or be the result of septic infection or gonorrhœa, the cervix should be dilated (if this has not already been done), the dull curette used, and the uterine cavity gently washed out with an antiseptic.

Chronic Metritis.

The student must distinguish between the condition known as 'chronic metritis' and the acute metritis which we have just considered. This state is rarely, as that term would lead him to suppose, the consequence of any acute inflammatory change in the interstitial tissues. It is not, or at any rate very rarely is, an *arrested* resolution, as in other inflammatory processes of a chronic character. This remark applies more especially to that form of chronic metritis in which the parenchyma of the uterus is the part principally affected. When the acute inflammation of the mucous membrane has subsided, we find that a chronic state of congestion occasionally remains, which becomes aggravated in time. The metritic changes that accompany this chronic catarrhal discharge from the endometrium have risen independently of any acute inflammatory process in the parenchyma. It is this hyperplastic change that we have to consider in chronic metritis. At the same time, we cannot, as Schroeder insists, separate from chronic metritis the idea of congestion, swelling, and pain; and consequently the clinical value of the term remains unchanged.*

CHRONIC ENDOMETRITIS.—The division of endometritis into cervical and corporeal is of considerable clinical importance, and the old term of 'endocervicitis' still retains its clinical significance.

Cervical Pathology.—We find inflammation of the cervical mucous membrane and the glands of Naboth, with hypersecretion of cervical mucus, alkaline in character, and enlargement and elevation of the papillæ. These have the appearance of granulations, so that the cervix assumes a granular appearance. These granulations bleed readily. Such abrasion of the epithelium is often still erroneously spoken of in practice as 'ulceration.' It is perhaps the most frequently met with of all uterine inflammations.

In that form of cervical endometritis characterized by a profuse

* See Chapter on Tuberculosis of the Uterus.

secretion, the villosities of the mucous rugæ are exaggerated, and sometimes glandular cysts form projections on the surface of considerable size.* The more superficial epithelial cells are elongated, or in a state of transformation. The glands are more numerous and scattered, or are in part obliterated by the formation of cysts. Much more frequently then in corporeal endometritis they are found in the muscular wall in a flattened condition. There is proliferation of the gland-cells, their nuclei being displaced, the cells altered in shape, much elongated, or, on the contrary, flattened and shrivelled, according as the mucous contents are retained or not. Around the glands and the vessels there is an increase of the normal cells, and an infiltration of round cells. The hyperplasia of the glands may give rise to hypertrophy of the neck, without any involvement of the stroma. Under the head of external cervicitis are included those inflammatory lesions which are seen on the external surface, and which are in pathological and anatomical continuity with internal cervicitis, not with vaginitis. The intra-cervical mucopurulent flow is frequently found on the external surface of the os, or inside or between the lips, the moist patches, of a vivid red, being accurately marked off from the remainder of the vaginal portion. Occasionally these red patches, by their undulating folds, recall the appearance of the intracervical mucous membrane. They are the catarrhal surfaces of Hart and Barbour. At times they have an eroded look. Their surfaces may be almost smooth, granular, papillary, or villous. With regard to the question of a true ulceration occurring in the neighbourhood of the lips of the os, Fischel, Doederlein, and others, have established that there is a loss of substance which exposes the cellular tissue. These true ulcerations, however, are very few in number, and are mingled with pseudo-ulcerative spots, which, as well as the ordinary papillæ, are covered by cylindrical epithelium. They may be thickened, or possibly effaced, by glands—cystic or otherwise—which are analogous to the intracervical glands, and in a case recorded by Cornil they were of a true sebaceous character. But it is a question whether, this partial pseudo-ulceration is not to be regarded as an erosion, an ectropion of the cervical lips, or a congenital anomaly. The fact that glandular cul-de-sacs have been found beneath the pseudo-ulceration, at a distance from the os, and under the stratified

* I am mainly indebted to the valuable work of Bonnet and Petit for this pathological summary given in the text: 'Traité Pratique de Gynæcologie;' Ballière et Fils, Paris, 1894.

pavement-lining which surrounds it, is advanced against the theory that the erosion is limited to the superficial layers of the epithelial pavement (Ruge and Veit, Fischel, Landau, Abel, Cornil).

The oblique direction in which the glands are found has been advanced as an argument on the other side. Ruge and Veit think that these are glandular neo-formations; but Cushing, Bonnet, and Petit question if they have not mistaken the appearance of incipient epithelioma for them.

The papillary or granular condition is found equally in the pavement epithelium and the cylindrical, which pass insensibly the one into the other in this situation, and give to it that papillary appearance which is so characteristic. Bonnet and Petit view the theory of ectropion of the endocervical mucous membrane, complicated by inflammation, as fitting in with most of the pathological facts. The ectropion is accompanied by more or less eversion of the subjacent muscular wall. The general physical appearances of such eversion are readily recognised.

Fischel made an examination of the uterus of twenty-eight infants, and found that in ten cases the vaginal surface around the external orifice was covered for a certain extent with cylindrical epithelium, and not with the pavement form, the usual situation of the line of junction between the two being thus lost. This constitutes what has been called a *congenital physiological ectropion.*

The cylindrical cells may be interspersed between islets of flat cells, or arranged in clusters analogous to those of the intracervical glands.

Bonnet and Petit conclude 'that from the histological point of view the pseudo-ulceration may be simply an ectropion of the intracervical mucous membrane, attended by superficial inflammation, associated possibly at the time with epithelial and dermal complications and eversion of the cervical lips. It may be an erosion of the pavement lining of the vaginal surface of the uterine neck, which can be increased by the presence of abnormal glands of congenital origin.' A congenital anomaly through a defect in the transformation of Müller's epithelium 'is another cause of this condition.' They think that true ulceration is always of a partial character, occurring over the false form, and is of the same nature as a follicular erosion, which results from the bursting of Naboth's follicles.

Diagnosis will depend more or less upon the presence of the enlarged follicles, and the character of the epithelium which covers the abraded part, whether that ectropion or eversion be of a

traumatic, inflammatory, or congenital origin. The obliteration of the papillæ through swelling of the mucous membrane accounts for the smooth appearance of the pseudo-ulcerations. The papillary, granular, or villous aspect may be due to an incomplete abrasion, or at certain points to a more extensive destruction of the papillæ on the vaginal surface.

Hypertrophic Endometritis.

With reference to corporeal endometritis, the authors I have quoted consider that *hypertrophic endometritis* has in its nature two factors, the one of an inflammatory, the other of a trophic origin. They divide corporeal endometritis into two forms: (1) that with hypertrophy of the mucous membrane, (2) that with atrophy of the same. In the former they describe a considerable increase of the endometrium, at the same time that it loses its normal firmness and is more easily detached, while its surface is broken up into elevations and depressions, due to alterations in its glandular structure, or possibly to true vegetations which in the course of time become polypi. The glandular degenerations or hyperplastic changes are more manifest and persistent in some cases, with the tendency to a natural transformation into the epitheliomatous type.

These glandular changes are in part due to a hypertrophy or hyperplasia, which has its origin in the cylindrical epithelial lining, part retaining, and part losing, its vibratile cilia (Cornil), the gland-tubes being choked with mucous and migratile cells. Hyaline changes, analogous to those seen in albuminuria, have been noticed by Cornil. In the connective tissue there is swelling of the cells and dilatation of the vessels.

Atrophic Corporeal Endometritis

includes those lesions which result from interstitial proliferation or the microbal action on the normally degenerated tissues. The interglandular stroma is sclerosed; the corporeal glands are atrophied; the lining epithelium is transformed or disappears; ulcerations occur discharging pus or blood.

Hyperplastic.

Here proliferation and hypertrophy of the connective tissue are the principal features, the cells not only swelling and proliferating, but assuming the aspect of true decidual cells, fusiform or giant. Sinéty has described a form of interstitial endometritis in which he discovered embryonic vegetations.

Hæmorrhagic Endometritis

is characterized by the number of small vessels seen on the surface of the mucous membrane. That condition to which we have already referred, in which polypi, whether glandular, muco-fibroid, or vascular, are found, has been denominated 'polypoid.' In these cases, there is a considerable increase in the interstitial tissue.



FIG. 275.—ADENO-CARCINOMA OF CERVIX UTERI. (× 100.)

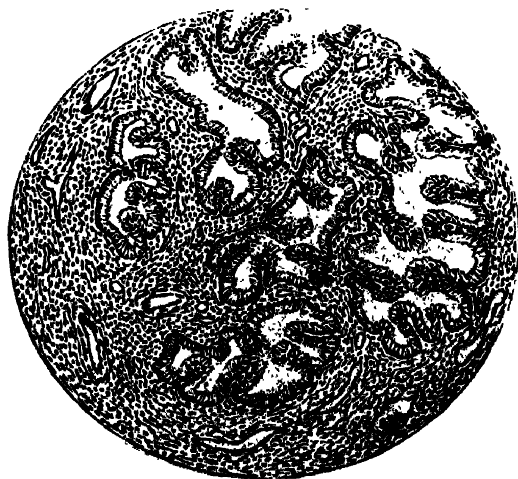


FIG. 276.—PAPILLARY EROSION OF THE CERVIX. (Targett.)

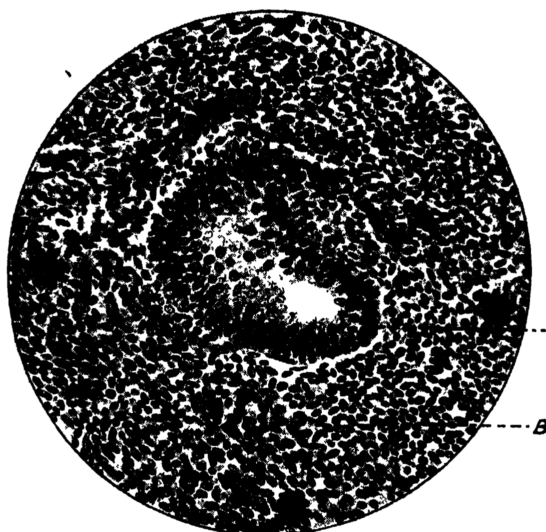


FIG. 277.—HÆMORRHAGIC ENDOMETRITIS. (High power.) *A*, swollen gland; *B*, inflammatory cell proliferation of matrix and blurred vessels in field. A section of curettings in hæmorrhagic endometritis, in which the ultimate ending of the case showed that it was sarcoma; the structure of the interstitial tissue presented a marked deviation from the normal, approaching adeno-sarcoma.



FIG. 278.—'CATARRHAL' ENDOMETRITIS. The glands are somewhat enlarged and the cell proliferation is not marked.

[I am indebted to Dr. Shaw-Mackenzie for these two drawings.]

Shaw-Mackenzie, in a paper before the Gynæcological Society, emphasized the difficulties of diagnosis in cases of hæmorrhagic endometritis, and the differentiation between it and malignant disease as sarcoma and adeno-sarcoma. In some cases enlargement and irregularity of the uterine glands, with infiltration of their walls with nucleated round cells, which also are seen between the glands, give rise to extensive proliferation. Large and numerous vessels with hæmorrhages were visible in the cellular matrix, rendering the appearances similar to those seen in the columnar cancer. The small celled infiltration makes the diagnosis from sarcoma difficult, and the differentiation of epithelial or sarcomatous cells from inflammatory, when the latter are isolated, not easy.

In some instances there is simply hyperplasia of the glandular layer of the

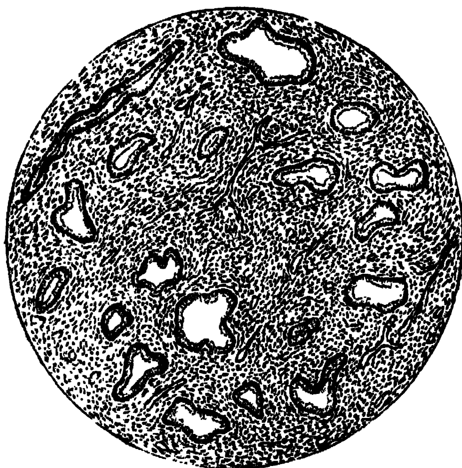


FIG. 279.—ENDOMETRITIS HYPERPLASTICA. (Author.)

mucosa without invasion of the uterine wall. These conditions would appear to be transitional between benign and malignant, the passage of a benign adenoma into an adeno-carcinoma. In those cases in which the proliferating masses project into the uterine cavity, there is an epithelial proliferating columnar arrangement; here microscopic examination enables us more readily to distinguish the benign from the malignant.

Shaw-Mackenzie further urges that in the case of erosions of the cervix and os care has to be taken in the differential diagnosis from the malignant states, and further that syphilitic erosions which bleed readily and are associated with an impaired state of health are apt to be confounded with malignant conditions.

Cases of Hæmorrhagic Endometritis cured by Curettage and Chromic Acid. (Author.)

It is questionable if 'hæmorrhagic endometritis' is a scientific term, the conditions found are so various. In a case, where the patient had severe hæmorrhage, I found a small raspberry-like projection in the uterus. The pathologist's report was that it was decidedly malignant, but the patient is at the present time alive and well. I lately operated on two cases bearing on this question. No. 1, aged twenty-four. Menstruation commenced at the age of twelve, and continued regular and normal until the age of fifteen. Then metrorrhagia set in, and continued excessively and unintermittingly for a period of six months. After this, erratic and excessive periods occurred until she was seventeen. She then suffered from *emansio mensium* for one year. In her own words, 'From that time the periods have occurred at intervals of a fortnight (sometimes less), and have often lasted ten days or more. The hæmorrhage was very dark in colour, with a great many large clots. Since the age of twenty I have been worse, sometimes being unwell for weeks together. This has weakened me considerably, rendering me liable to sudden giddiness and attacks of fainting. I have had considerable pain at either side when the hæmorrhage lasted for any time.'

No. 2 was that of a lady, aged thirty-two. She suffered from leucorrhœa for some years, and, as far back as 1891, she had been under treatment for endometritis, and was frequently depleted. Curettage was advised and carried out. Previous to this there had been no hæmorrhage, but after the operation it begun to recur, and from then to the present year she had been subject to metrorrhagia. As she said, 'The hæmorrhage generally lasted from one period to the next. I was occasionally free for a day or two, but it seldom quite stopped.'

In No. 1, I found the uterus enlarged, though not to any great extent, the canal measuring about three inches. The patient was married, but had no children. There was a profuse hæmorrhagic discharge, and a deep erosion surrounded the os uteri. In No. 2 the uterus was considerably enlarged, the cavity measuring three and a half inches. The only sign was the continuous hæmorrhage. Both these cases were subjected to the same treatment—dilatation of the uterus, free curettage of the entire cavity, and the application with the cotton-wool holder of a solution of chromic acid, one drachm to the ounce. In both cases the result has been equally satisfactory. The operation was performed in July, 1897. The catamenia have since been quite regular, and there has been no hæmorrhage. Both patients were given hydrastis and stypticin for some time after the operation.

The pathological reports were as follows :—

'Case 1 : The stroma of the endometrium is much infiltrated with inflammatory products and extravasated blood. The glandular tubules are abundant and for the most part well defined. Though the appearances are suspicious in places, there is no definite evidence of malignant disease. Case 2 : The curettings have been embedded and cut. The sections show hypertrophic

and dilated glandular tubules, and considerable increase of the cellular stroma, as in fungous endometritis, but there is no evidence of malignant disease.—J. H. TARGETT.'

Endometrectomy.

Casati originated, and Dührssen adopted, this method for the treatment of recurrent hæmorrhagic endometritis where curettage had failed. The anterior vaginal vault is opened, and, the anterior wall of the cervix having been exposed, the peritoneum is either detached from it or divided. The uterus is next incised as far as the fundus, and the uterine and cervical mucosa are stripped off. The incision may be of a T shape. It is closed by circular sutures carried round the uterine cavity below the incised surface.* Caseous degeneration occurs occasionally in the follicles. To this we shall refer in the text.

Causation (Predisposing and Exciting).—We may group the causes of chronic endometritis thus :—

1. Predisposing—
   - Constitutional (tubercle, syphilis, chlorosis).
   - Defective diet.
   - Excessive lactation.
   - Frequent labours and subinvolution.
   - Mental causes.
2. Exciting—
   - Excessive coition.
   - Exposure to cold during menstruation.
   - Gonorrhœa.
   - Vaginitis.
   - Displacements.
   - Stenosis of cervix.
   - Polypi.
   - Laceration of cervix.
   - Abortion, miscarriage, parturition.

Symptoms and Physical Signs.—The chief are pelvic pains and backache, attended by difficulty in walking; leucorrhœa of a viscid character; occasionally vaginitis; dysmenorrhœa; dyspareunia; sterility, from the impediment to the passage of the semen, and the action of the secretion on the spermatozoa; deterioration in the general health.

On examination by the finger and speculum, we often find the lips of the os uteri swollen, or denuded of its epithelium, and some

* *Centralblat. f. Gyn.*, § 1353, 1898.

surrounding erosion or granular degeneration of the adjacent cervix. Occasionally there is the characteristic viscid discharge blocking up the cervix, which is removed with difficulty. A version or flexion may be detected.

Prognosis.—As it is the most frequent, so is it often the most inveterate of uterine states. This is the experience of every gynæcological surgeon. Or, if we have succeeded in altering the nature of the secretion, and have finally arrested it, a lull in the treatment is occasionally followed by a return of the old complaint in as aggravated a form as before. The longer the affection has lasted, and the more copious and viscid the discharge, especially in those cases in which the uterus is malformed, the worse is the prognosis.

Treatment (Local Therapeutic Measures).—As I have already referred to the methods of applying various substances to the interior of the uterus, and the manner of dressing the cervix, I shall only enumerate briefly the most efficient means of treatment. The first and most important point to decide is, whether the inflammation be localized in the cervix, or involve the fundus. In this we must be guided by the character of the discharge, and the size and sensitiveness of the body of the uterus.

Assuming that the cervix alone is inflamed in a case in which the cervical canal is narrow and the isthmus contracted, our first step should be to secure such dilatation of the cervical canal as will permit of the free flow of any discharge, and also allow room for a topical application to the mucous membrane. This is best done by bilateral incisions.

The loss of blood consequent upon the incisions will be of service. The use of dilators will also secure sufficient dilatation. The uterus may be dressed and the plug of cervical mucus wiped away, either with a small piece of dry sponge fixed on a sponge-holder, or with a little cotton-wool rolled tightly round the point of a rough uterine probe. The hot vaginal douche may be used either with borax, carbonate of soda, boiled starch, Condy's fluid, laudanum, tincture of iodine, or liquid extract of hydrastis added to the water. Kreuznach *mütter lauge* or that of Woodhall is an excellent addition (two ounces to the quart). Depletion of the cervix repeated a few times hastens the cure. Such applications as carbolic acid and glycerine, ichthyol and glycerine, extract of hydrastis and glycerine, tincture of iodine and glycerine, chromic acid solution, nitrate of silver, Braxton Hicks' fused zinc crayons, or iodoform, are very useful. The nitrate

of silver may be applied on a uterine probe, by first fusing a little of the silver salt in a small crucible (Fig. 153) over a spirit-lamp, and then dipping the point of the probe into the cup, so as to get a film of the nitrate of silver on it. But by far the most efficient and perfectly safe agent, when applied with due care, is fuming nitric acid. (See full directions for its application, p. 153.) After making use of any of these agents, a glycerine tampon should be passed into the vagina. Ichthyol solution, ten to twenty per cent.,

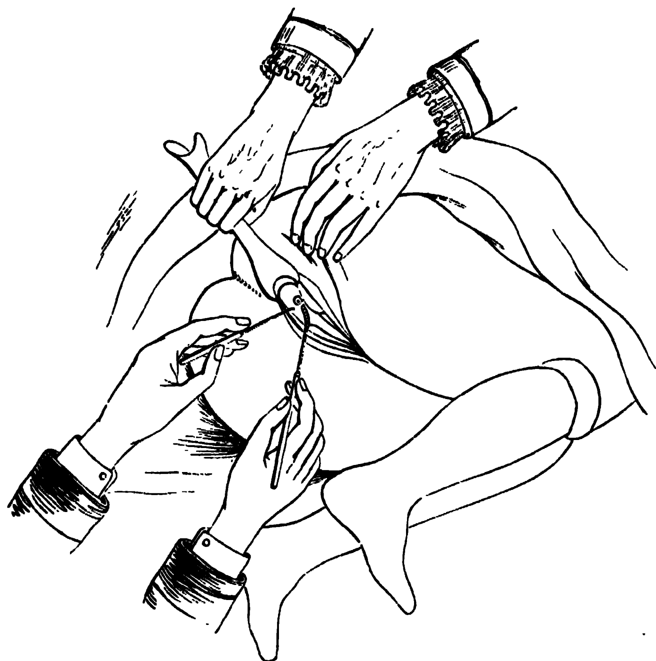


FIG. 280.—DRESSING THE CERVIX WITH SIMS' SPECULUM AND UTERINE PROBE IN THE LATERAL POSITION.

is an efficient application in chronic inflammatory states of the cervical endometrium. Its local use may be combined with its internal administration. Like many other vaunted remedies, ichthyol fails in some cases to give any result.

General Treatment.—The patient must abstain from coitus; have as much outdoor exercise as is suitable to her strength; much standing is to be avoided. Change of air, proper tepid bathing of the body, simple, yet nutritious, diet, moderation in alcohol, long hours of rest, careful attention to the secretions, are all important

aids towards curing the disease. The most important medicines are arsenic, quinine, hydrastis, viburnum prunifolium, the mineral acids with the vegetable tonics, bark, columba, gentian, nux vomica. If there be nervous excitement and much pain, the bromides are indicated.

CHRONIC CORPOREAL ENDOMETRITIS.—While it is of the utmost importance to recognize the clinical fact that chronic cervical endometritis *per se* is a frequently occurring affection of the uterus, it must not be thought that endometritis of the body is ordinarily met with apart from the cervical catarrh. On the contrary, every practitioner knows that the corporeal inflammation is generally attended by varying degrees of cervical endometritis. In chronic corporeal endometritis, not only are the utricular glands of the body involved, but also those of Naboth in the cervix. The exaggeration of the natural secretion from the utricular glands is the most prominent sign of the affection. Post-mortem examinations show that the mucous membrane is found, at the commencement of this disorder, swollen and reddened; later on it is paler and of a gray colour.

The glands, finally, are atrophied, the mucous membrane is deprived of epithelium, and the deeper layers form sprouting granulations, which at times assume the appearance of small polypi.

The cavity of the body is enlarged when the disease lasts for any length of time, and there may be a mere lining of connective tissue, which takes the place of the natural mucous membrane.

Causation.—Those causes which operate in producing the cervical, likewise bring about the corporeal endometritis. There are, however, a few uterine affections with which the latter affection is constantly associated, or that it is a sequence of—

Subinvolution of the uterus.
Abortion and miscarriage.
Obstructive dysmenorrhœa.
Prolonged lactation.
Flexions.
Gonorrhœa.
Vaginitis.

Symptoms and Physical Signs.—The principal are a glairy discharge, at times coloured, and tinged with blood, or purulent and shreddy; amenorrhœa, dysmenorrhœa, or metrorrhagia; sterility;

all the symptoms already noted of cervical endometritis in an aggravated form. Frequently there is enlargement of the uterine canal, and increased sensitiveness of the entire uterus, which by bimanual examination is found enlarged.

Treatment.—Various useful local applications have been already alluded to in the treatment of this affection. Intra-uterine medication and the different methods of applying absorbent, emollient, stimulant and caustic remedies to the uterine cavity have been referred to. The special dangers of intra-uterine injections have also been pointed out. It is not necessary to discuss these matters a second time. The practitioner will find that any or every form of local treatment will fail in some long-existing cases of endometritis. In practice I have found the following the most efficient methods of treatment of corporeal endometritis.

1. General treatment, such as that indicated in endo-cervicitis.

2. Dilatation of the internal os with tents or bougies.

3. Curettage, followed by the application of chromic acid, especially if from metrorrhagic discharge there is reason to suspect a granular condition, or fungosities or a polypoid state.

In any obstinate case of chronic endometritis I now at once proceed to curette the cavity, and combine this treatment with drainage and subsequent cleansings.

4. Other intra-uterine medication, especially carbolic acid and iodine, ichthyol ten per cent. solution, extract of hydrastis, may be tried.

5. *The application of nitric acid to the cavity of the fundus.* I regard this, after curettage, as the most certain means of dealing with the disease. It has the disadvantage of cauterization, and its effects on the endometrium. I rarely employ nitric acid now, as curettage and chromic acid answer every purpose—*always providing that the curettage be thorough*, and that chromic acid in solution be subsequently applied.

6. Depletion of the cervix.

7. The vaginal douche, using with it iodine, borax, carbonate of soda, Kreuznach water (the mother-liquor of the same spa), or that of Woodhall.

8. The persistent use of glycerine with hydrastis and ichthyol tampons.

9. If a displacement exist, rectifying it and adjusting a pessary, when the inflammatory state has been treated for some time.

Zinc Chloride Treatment.—The cauterization of the uterine canal with *zinc chloride* as a means of treating chronic enlargement of the uterus has been practised by Rheinstädter, Dumontpallier, Frankell, and others. The zinc (grs. xxx.—ʒi. to the ounce) is applied twice in the week. The vagina should be carefully protected, and any of the solution that may touch the vaginal wall should be immediately neutralized with bicarbonate of soda.

The practitioner in using zinc chloride will find it safer to adopt the precaution advised in the application of all powerful intra-uterine medicaments, by securing sufficient patency of the cervical isthmus, avoiding excess of the solution applied, and giving due attention to the time of application as regards the occurrence of the catamenial flow. The value of iodoform gauze, whether alone or combined with curetting, as an intra-uterine dressing and as a vaginal tampon, I have before alluded to.

Galvano-chemical Cauterization.

G. Apostoli, of Paris, treats chronic metritis by means of the galvanic current, beginning with a weak current at first (20 or 30 up to 80 milliampères at the first sitting), and gradually reaching 200 milliampères. Ten minutes is the time allowed for a sitting. The positive pole he recommends to be placed in the uterus in hæmorrhagic and ulcerative states, the negative in other conditions. At all sittings the strength of the current is to be increased gradually, and, if rest in bed cannot be secured, once a week is often enough to operate, otherwise twice weekly. Coitus must not be permitted. Pregnancy is to be first carefully excluded. Any existing or recent perimetritis will contra-indicate the treatment. Apostoli claims for this method—*

1. Its ease of application and harmlessness.
2. The gradual nature of the cauterization, which is always under control.
3. Its chemical as well as caustic action.
4. It may be used either to restrain hæmorrhage or reduce congestion.†

Syphilis.

The occasional relation of syphilis to chronic inflammatory states of the endometrium should not be forgotten. I can most strongly recommend the *tannate of mercury* in all secondary or tertiary syphilitic affections. Both it and the percyanide of mercury (as elsewhere advised) are admirable preparations of mercury to administer to women. A pill of—

Hydrarg. tannatis, gr. ss. to gr. i.
Quinæ sulph., gr. i.
Ext. gentian, q.s.,

* See remarks on Gynæcological Electro-Therapeutics for full details of this treatment.

† See p. 387 for Vapo-cauterization.

to which, if necessary, $\frac{1}{36}$ to $\frac{1}{50}$ of a grain of arsenious acid may be added, will be found a most effectual remedy in chronic or recurrent syphilitic states. With either of these preparations of mercury, this mixture of the three iodides of potassium, sodium, and ammonium, may be combined.

Microscopical Diagnosis of Growths of the Cervix Uteri.

In the face of the difficulty of diagnosis of morbid growths of the uterus by means of the microscope, and the various appearances presented at different periods of life by the normal uterine tissues, it is clear that only experienced experts should venture to decide upon the nature of the tissue examined as to its benign, tubercular or malignant character. Plimmer (*Brit. Gyn. Jour.*, Nov., 1895) gives the following instructions as regards the immediate treatment of a portion of tissue which has to be submitted to a further examination : place first in a solution of—

Sodium chloride, 7·5 gr.
Glacial acetic acid, 10 c.c.
Distilled water, 1 litre.
Mercuric chloride to saturation.

Next wash in running water for two or three hours, and then place in 50 per cent. of alcohol for twenty-four hours. After this, immerse in 90 per cent. of alcohol for twenty-four hours, and finally in absolute alcohol for twenty-four hours. This process is pursued before the portion is passed through cedar-oil into paraffin, or cut with a freezing microtome, or a rocking or paraffin microtome. I give this method of ready preparation of a specimen, as it is one at hand for every one. With regard to pieces to be examined, he says that it is better, when possible, to cut out a piece or pieces from different parts, which shall include both the mucous membrane and a small portion of the underlying muscular layer, and when the curette is used for diagnosis, the surface of the muscular layer should be included. No one can read the pertinent directions and observations of Plimmer in the paper referred to without realizing how extremely deceptive are many of the appearances seen, not only in normal states of the cervix, but in simple inflammatory affections, Also we realize how vital it is, in the conduct and supervision of any case of cervical disease, whether it be simple hyperplasia, any form of erosion, hypertrophies and polypi, or adenomatous growths, to secure, if possible, careful pathological reports as to the nature of the affected tissues.

I can only repeat here the caution, several times reiterated in this work, that practitioners, in the treatment of all suspicious chronic enlargements of the uterus, should satisfy themselves thoroughly as to the condition of the endometrium by the assistance of dilatation, the dull curette, and the microscope. These aids to diagnosis become the more necessary when we have—

Cystic and follicular degeneration of the cervix.
Shreddy discharges from the uterine canal.
Softness and tenderness of the uterine walls.
Any foul-smelling discharge.
A recurring sanious flow.

We may thus early detect histologically the presence of tubercle or cancer.

SUBINVOLUTION FOLLOWING LABOUR.

Pathology.—As I always taught students to regard subinvolution of the uterus as a chronic hyperplasia, it is the view which I shall briefly represent here.

The entire organ is enlarged, its walls are thickened, and its cavity increased in size. The student obtains the best idea of the causes of this increase when he recollects the changes which occur in the tissues—muscular, cellular, lymphatic, and vascular—of the pregnant uterus. After conception all these tissues are enlarged. The period of complete development is arrived at when parturition occurs. After labour there is a process of 'retrograde metamorphosis,' when the uterus, especially during the puerperal month, passes through the series of changes that constitute involution. Absorption of *débris*, fatty degeneration of the muscular tissue, and formation of new elements, are the means by which this change is accomplished and completed, in a period of from six to eight weeks. Should this katabolic process be arrested from any cause, we have an unabsorbed fatty *débris*; enlarged muscular fibres, with embryonic elements of new tissue; hypertrophied areolar tissue; increased size, both of the bloodvessels and lymphatics. While the muscular elements remain thus stationary, or after a little time commence to atrophy, the connective tissue is increased, and the uterus is arrested in a state of general congestion, with enlarged vessels. According to Finn of St. Petersburg, the hyperplasia of the muscular fibres is an essential part of the process, the augmentation in the connective tissue influencing it but little. The number of muscular fibres is always increased. There is no difficulty in understanding why hyperplastic deposits and rapid development of connective tissue follow. This hyperplasia is the essential pathological condition of the affection. As occurs elsewhere, the connective-tissue growth strangles the vessels, and consecutive atrophy

follows. Change in colour and size of the uterus is the result. The last stage is one of contraction and shrinking.

Apart from pregnancy and labour the surgeon often meets cases in which, with cervical endometritis, there is considerable enlargement and subinvolution of the uterus. In unmarried girls we frequently find considerable uterine enlargement, not myomatous, associated with displacement.

We constantly see patients, married and single, in whom the

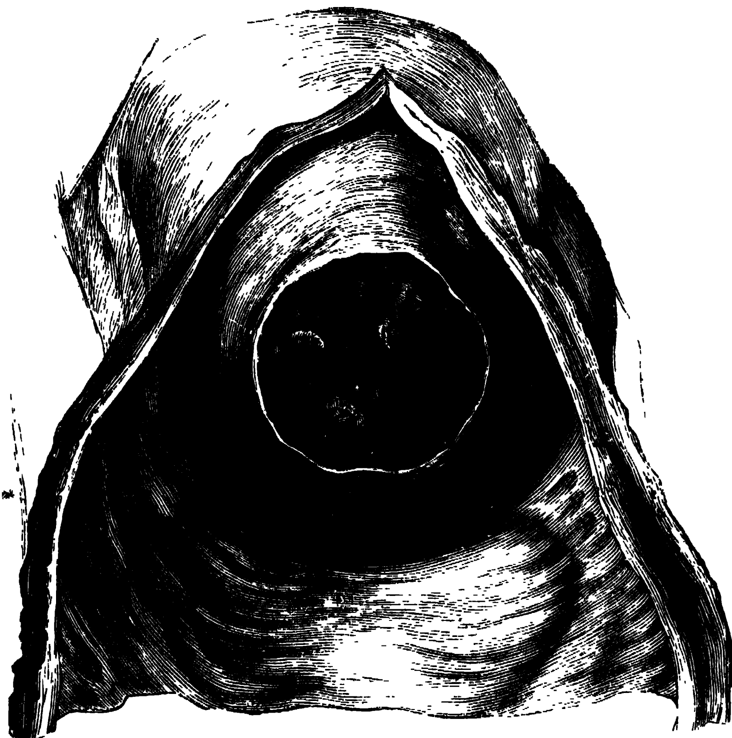


FIG. 281.—EPITHELIAL DENUDATION AROUND THE OS UTERI, SHOWING EFFECTS OF LABOUR ONE MONTH AFTER PARTURITION. (Robert Barnes.)

cavity of the uterus is enlarged to the extent of three inches and over, who are nulliparous. Sclerosis of the uterine parenchyma, some version or flexion, and a chronic endocervicitis are present. Thus, chronic congestion leading to transudation, hypertrophy, enlargement of the uterus, and hyperplastic change, with cellular tissue formation, may, and frequently does, arise in other ways than as a sequence of pregnancy.

Causation.—We find the causes of subinvolution most frequently in parturition and neglect during the puerperal month; rising from bed, standing, or over-exertion too soon after delivery; puerperal peritonitis, or metritis; laceration of the cervix; endometritis, corporeal and cervical, and the causes which produce these states; frequent pregnancies; prolonged lactation; versions and flexions.

Diagnosis.—By digital examination, if the cervix be involved, we detect a rather open os, which is swollen and painful; a sensitive, though somewhat hard, cervix, which has descended in the pelvis. The uterus is generally either anteverted or retroverted, more frequently in the former position. By the bimanual examination the body of the uterus is found enlarged, and by careful palpation the fundus is discovered, unless it be retroverted, above the pubes. The uterine sound passes for the extent of three or three and a half inches. The history of the case, pointing either to an old endometritis, a recent parturition or abortion, or irregularity in the menstrual flow, will confirm the diagnosis. The chance of pregnancy existing must be carefully remembered; and if any doubt exist, it is better to postpone the passage of the uterine sound.

There are some negative signs it is well to remember in differentiating this affection from pregnancy or malignancy. The cervix is rarely soft; there is no progressive enlargement of the uterus from month to month; the uterus does not generally increase in size beyond three and a half to four inches; the other signs and symptoms of pregnancy are absent; there is not the cachexia of cancer; the discharge, if any, is not foul-smelling; there is not the pain of malignant disease. With these facts in our mind, we are not likely to mistake chronic hyperplasia for either early pregnancy or cancer of the uterus.

Symptoms.—There is scarcely any symptom, either constitutional or local, attendant upon a uterine affection, that a woman afflicted with chronic hyperplasia of the womb may not suffer from. To enumerate these would be to recapitulate all the various local and pelvic pains and reflex disturbances which arise from chronic endometritis, with enlargement of the womb, or from displacement. The intensity of the symptoms will depend on whether the fundus alone, or the cervix, or both, are enlarged. The more prominent symptoms usually are: difficulty in walking, lumbar and sacral pain, pelvic distress from pressure on the bladder or rectum, nausea, dyspareunia, loss of appetite, and various nervous disorders. If

the fundus be the part principally engaged, there is very often menorrhagia or metrorrhagia.

***Treatment.*—If inflammatory conditions of the endometrium are present, these must be treated in the manner already indicated, The hot vaginal douche is useful. The uterus should at intervals be freely depleted, and a glycerine and ichthyol tampon used.**

Sexual intercourse must be avoided, or only indulged in at long intervals. Weir Mitchell's rest plan may be tried, in the manner detailed at p. 215. To those who can afford it, a course of waters and baths at Kreuznach, Woodhall Spa, Kissingen, or Ems, may be recommended; Schwalbach, Barrèges, or Spa, if a ferruginous spa is indicated. Royat, with its arsenical and iron water, and Bourboule with its stronger arsenical springs, are among the most valuable arsenical spas in Europe. At all times change of air, temporary residence by the seaside—and no country is so rich in health-giving seacoast resorts as England—will do much to assist the treatment. Where the patient cannot go to the seaside, the seaweed-essence gives an admirable salt-water bath at home.

Vesication.—Gaillard Thomas (after Aran) advised free vesication of the cervix, through a cylindrical speculum which embraces it tightly. Vesicating collodion is used. The patient rests in bed after its application, and a glycerine pledget is inserted. A discharge of serum occurs within twelve hours. Any laceration of the cervix has to be closed.

Iodine.—In the treatment of both chronic hyperplasia and cervical endometritis, the iodized pledgets of absorbent wool are often of benefit. One of these iodized balls may be dipped in glycerine and applied to the cervix. It is retained in position by a tampon of salicylic acid wool and glycerine. Iodized vasol * is an admirable medium for the use of iodine in vaginal examinations and for tampons.

Hydrastis and Ichthyol.—The free use of hydrastis and ichthyol in tampon and douche is of service. But perhaps the most important portion of the treatment consists in attention to the general health, and in securing judicious rest without unnecessary and prolonged confinement, which often leads to a state of chronic invalidism.

---

* Poppelreuter, 54. Portland Street, Manchester.

CHAPTER XVI.

LACERATION OF THE CERVIX.

THIS lesion, varying in the number of rents or fissures of the cervix, their depth, and the degree of pouting of the cervical canal, is the consequence of labour. It results most frequently from manual or instrumental interference, and too early rupture of the membranes. In short, it is often, though by no means necessarily, the fruit of 'meddlesome' midwifery and hastily conducted labours. In those rapid labours, in which delivery is precipitated, such rents are apt to occur.

The rent is generally transverse, for, as Goodell points out, the fissure-line, when lying in this direction, crosses the axis of motion of the uterus, and hence the tendency to separation of the flaps. At other times the fissures are multiple, as in this drawing after Emmet.

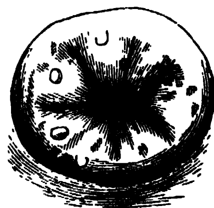


FIG. 282.—STELLATE LACERATION. (Emmet.)

According to the same authority, laceration is most frequent on the left side, this being attributed to the position of the child's head in the right oblique diameter, the occiput lying anteriorly, and to the left. Bell, of Glasgow, has drawn attention to the correlation existing between laceration of the cervix and tubal affections, remarking that the affected adnexa are found on the side of the laceration. This may possibly be so in some cases, but it certainly is an association to which we constantly find exceptions. The percentage of women suffering from uterine disease, who are subject to laceration of the cervix, has been variously estimated by leading American writers at from ten to forty per cent. (Mundé, Ambrose, Pallen, Barker, Emmet, Goodell).

That the cervix uteri is more or less torn in a large proportion of labours all will admit. But many such rents close spontaneously,

and a considerable number cannot be said to cause either ill consequences or any suffering to the woman.

Surgeons must not, then, take up any extreme view of the necessity for interference in every case of lacerated cervix. Its relation to morbid womb conditions is now generally acknowledged, and we have especially to thank American gynæcologists for this, as for many other valuable additions to uterine pathology. We have, however, to avoid being influenced in practice by an exaggeration of the results which follow from a laceration. A careful examination of the uterus will enable us to judge of the case demanding operative interference, and the one which may safely be dealt with by palliative measures, or let alone.

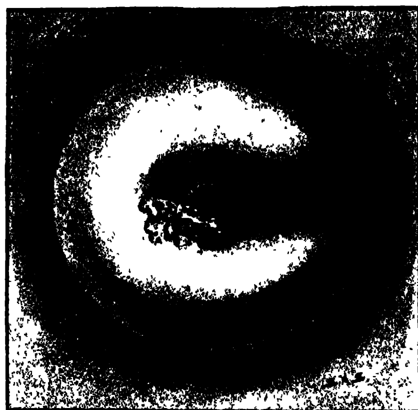


FIG. 283.—UNILATERAL LACERATION OF THE CERVIX, WITH ENDOMETRITIS AND EROSION. —Curettage, chromic acid (grs. xxx., ad 31), laceration closed, nitric acid applied to erosion. (Author.)

Authorities are still divided as to the etiological importance of laceration of the cervix, in regard to various uterine pathological conditions. For example, Emil Noeggerath declares that 'women are *more* likely to conceive when there is a laceration than when there is not; the position of the uterus is *not* affected by laceration, its axis is *not* elongated as a consequence, erosions and ulcerations are *not* more frequently met with lacerations than without, they have *no influence* in producing uterine disease, eversion of the lips is *never* the direct result of a laceration.' Noeggerath goes so far as to assert that laceration will soon disappear from the list of pathological affections of the uterus, and that operations for their cure will be things of the past. On the other hand, Mundé declares that cervical lacerations do act as predisposing factors in the production of uterine disease, the frequency and severity of the lesions increasing directly in proportion to the length and depth of the tear. He also arrives at the conclusion that they lessen the productive fertility of a woman. I believe that the truth lies in the mean between these two extremes of opinion—certainly rather

on the side of the American view of the importance of the lesion.

I have seen a lady who was stitched in America for a laceration of the cervix, 'unstitched,' as she expressed it to me, by another surgeon there, for too successful closure of the cervical canal (that is, the cervix uteri was divided), and she was 'stitched' a second time for too free undoing of the previous 'stitching' of the original tear. Subsequently she nearly lost her life in London through an attack of peritonitis after a curetting operation from which she derived not the least benefit. Each time she came I deprecated interference. She simply had 'uterus on the brain.' She subsequently went through some form of operation for so-called 'removal of the neck of the womb,' though when she came to me after this step, and pressed me to again examine her, my gynæcological sense of touch was not sufficiently educated in point of delicacy to detect an absent cervix. Will she have this incorporeal neck bisected for a second time by some as yet unknown gynæcological benefactor? History may record!

With regard to recent lacerations, many advocate, and apparently with reason, that the sooner the rents are closed, the better, the sutures acting also as a hæmostatic. It is asserted that the lochial flow does not prevent primary union, but any such operation must be conducted with every possible antiseptic precaution. Dodelin, Sanchez, Toledo, and Strauss have shown that the normal lochial discharge, when taken from the uterus, is devoid of germs, but that if there be fever, both bacilli and cocci are found, which are eliminated with more abundant secretions of a purulent character. The pathogenic microbe is the *Streptococcus*. Similar germs have been found by Péraire in the secretions of puerperal metritis.

I could instance several cases of women restored to health and procreative capacity, whose lives were miserable before extensive lacerations were cured, and I have seen several cases in which I believe the predisposing cause of serious uterine disease lay in old eversion and erosion, the consequence of an unremedied rent in the cervix.

Diagnosis.—Though in the majority of cases there is not any difficulty, with a careful examination, in discovering a laceration of the cervix, still, there is little doubt but that it often escapes detection. This is more apt to occur when there is a considerable abrasion of the cervix.

When the cylindrical speculum is used, this is more likely to happen, for we may press the lips of the fissure together, and thus close the torn lips of the mouth of the womb.

An examination for a laceration of the cervix should be made in the dorsal position or in this manner: The woman is placed in the semi-prone position, and Sims' speculum is applied: a tenaculum is hooked into each lip of the rent, and the two are drawn forwards,

2 B

when, if it be a laceration, the raw surface disappears, and the characteristic cleft is left.

Consequences.—Erosion of the os and cervix; eversion of the cervical canal; subinvolution; endometritis; perimetritis; cicatrization of the cervix, and sterility. There is little doubt that it predisposes to epithelioma and malignant disease of the cervix.

Symptoms.—These will depend, in urgency and severity, on the extent and depth of the laceration, and the inveterate character or the intensity of the attendant complications. If the laceration be chronic, we frequently find an easily-bleeding cervix, menorrhagia, endocervical discharge, pain in walking, loss of sexual desire, neuralgia, and reflex nervous disturbances.

Treatment.—It is either palliative or operative. The palliative treatment consists in rest, warm vaginal douche, local depletion,

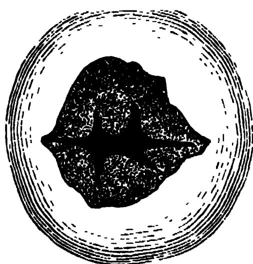


Fig. 284.—Bilateral Laceration, First Degree, with Erosion. (Bonnet and Petit.)

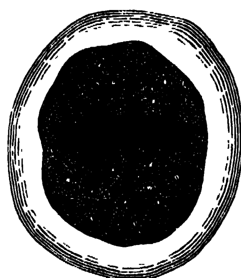


Fig. 285.—Bilateral Laceration, Second Degree. (Bonnet and Petit.)

attention to the eroded cervix, glycerine tampons, and astringent douches. Such remedies as tampons of borax and glycerine, tannin and glycerine; applications of carbolic acid and glycerine with iodine, ichthyol, chromic acid solution, and the other means spoken of for the treatment of menorrhagia, are applied.

To help the healing over of the eroded surface, and the glazing of the congested papillæ, applications of iodine, hydrastis, chromic acid, weak nitrate of silver, and perchloride of iron solutions may be used locally.

Emmet advises, as a palliative measure, the passing of a silver suture through the flaps to prevent them from gaping.

Operative Measures.—Such palliative treatment should be pursued in order that the uterus may be brought into a fit state for operation, when all symptoms of inflammation or perimetritis have

disappeared. The week after a menstrual period is chosen. The instruments required are a vaginal douche, a duck-bill speculum and a few vaginal retractors, two tenacula, a long-handled knife, a curved and angular scissors, short lance-headed needles of Emmet or Sims, curved needles, needle-holder, silver wire, forceps, gut or silk. (See plates of appliances for the various needle-holders, needles, and scissors, useful in trachelorrhaphy).

Trachelorrhaphy is thus performed. The patient is brought well to the edge of the bed or operating couch in the lithotomy position. The vagina is thoroughly sterilized. A crutch is used to separate the thighs, if assistants be not at hand. The cervix is exposed, and drawn down with the vulsellum, and kept in position by an assistant. The edges of the laceration are first brought into a position to judge how far the uterine surfaces have to be denuded. A stout rubber watch-spring ring is by some slipped on to the base of the cervix to control bleeding.

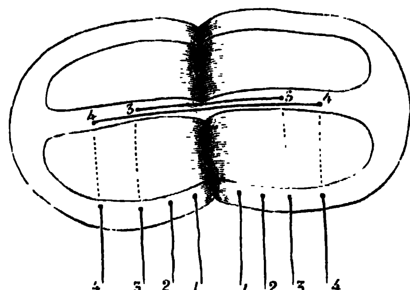


Fig. 286.—Emmet's Operation—Denuded Surface and Sutures.

The operator begins by denuding one side of the laceration, and removing the tissue, as shown in the drawing. The cicatricial tissue in the angle of the laceration is completely removed. The same step is taken on the other side if the laceration be bilateral. Each lip of the laceration at either side is seized in a vulsellum, and both are brought together so as to see the effect of the denudation. The sutures are now passed and the rent is closed. A broad strip of the cervical surface is left untouched, to form a future cervical canal.

Fig. 286 shows the surface denuded, and the course of the sutures, after Emmet. Fig. 287 exemplifies the way in which the sutures lie in the cervix before they are tightened. Fig. 288 explains the closure of the cervix and the tying of the sutures. The sutures are passed in the order 1, 2, 3, 4. One side is first united and closed, and afterwards the others. The entire operation is performed with the strictest aseptic precautions. For the first forty-eight hours the vagina is kept tamponned with sterilized iodoform gauze. After this the vagina is douched out with some weak disinfectant, and then

a loose tampon of moistened chinosol is placed in it. This is repeated daily. It is better, after operating, to draw off the patient's urine, but from the third day she may pass water herself, leaning forward on her knees. The silver-wire sutures should not be disturbed for ten or twelve days. I have, to my

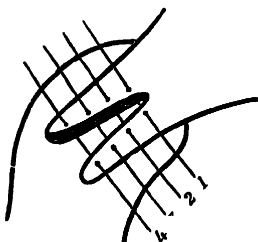


FIG. 287.—SUTURES PASSED.

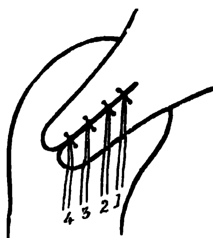


FIG. 288.—SUTURES APPLIED.

disappointment, found removal of the sutures on the seventh day prevent the union which, had they been undisturbed, would have been secured. I believe the mistake which causes many failures after all perinæal, utero-vaginal, and vesico-vaginal operations is too early interference with the sutures.

CHAPTER XVII.

EROSION, GRANULAR AND FOLLICULAR DEGENERATION OF THE CERVIX.

Pathology.—The term 'ulceration' of the uterus has disappeared from the vocabulary of the gynæcologist. This remark does not, of course, apply to the consequences of malignant and syphilitic diseases of the cervix. But that common condition which was ordinarily regarded as one of ulceration, has been proved to be nothing more than a desquamation of the superficial epithelial layer covering the lips of the os uteri and cervix.

The reader will here refer to the remarks already made on the Pathology of Chronic Endocervicitis; and the observations of Bonnet, Petit, Landau, Abel, and Cornil on this subject (p. 338).

This is attended by increased vascularity and growth of villous projections, which protrude on the surface under a single layer of epithelial cells. The bright spots seen within the area of the eroded or granular patch were regarded as hypertrophied papillæ, enlarged and highly vascular. Thus, Scanzoni described an 'aphthous' erosion, in which the mucous membrane is denuded of epithelium; and Schroeder included a notice of 'ulcers' of the cervix with 'erosions,' and he describes a papillary form of erosion in which the papillæ develope into 'granular elevations. According, however, to the researches of Ruge and Veit, the raw surface is covered with a single layer of epithelium, and the supposed papillary granulations are neoplastic formations. Recesses are formed by extensions inwards of the epithelium, and thus a papillary or villous appearance is given to the erosion. Friction, even such as is necessitated in wiping away the thick purulent secretion which is found covering the cervix, causes bleeding from the superficial bloodvessels. This state has received the name in this country of 'cock's comb' ulcer or granulation, but the accompanying change in the follicles of the cervix is not to be lost sight of. The glands

are distended, and the openings are gradually closed, through swelling of the adjacent tissue or the formation of new connective tissue. Cysts are formed, some of which may burst on the surface and discharge their contents. This cystic degeneration may involve the entire cervix.

Plimmer, in a paper on 'The Diagnosis of Growth of the Cervix Uteri,' * says—

Varieties of Erosion.

'This is a condition, also, which should be watched, and in which pieces should be examined from time to time according to the clinical symptoms. We must never forget, also, that with every inflammation hyperplasia of epithelium may occur.

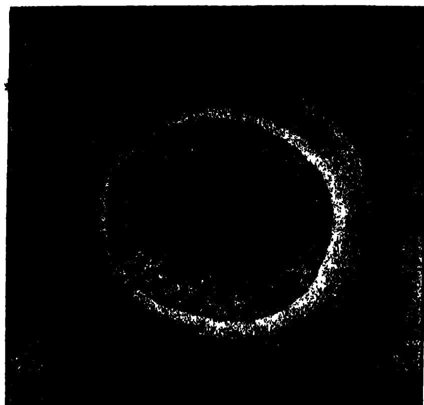


FIG. 289.—EROSION OF THE CERVIX. (Author.)

'As regards the so-called "erosions," they are characterized by the vaginal surface of the cervix, which is normally covered by squamous epithelium, getting covered by more or less cylindrical epithelium, which may sometimes even dip a little into the tissues. This condition is really so like ectropion that it is only in a virgin uterus that it can be easily differentiated. A real erosion in the pathological sense it is not, but rather the covering of a surface with columnar epithelium, which normally would be covered with squamous epithelium. There is here not much change in the connective-tissue stroma, and only a small quantity of round-celled infiltration. The dipping in of the columnar epithelium into the tissues forms gland-like formations, which, however, are much shorter than the ordinary cervical glands. This is the condition usually called "*erosio simplex.*" When this columnar epithelium sinks deeper into the connective-tissue stroma, and is raised to the original level of the surface, small pseudo-papillæ are formed; this is the so-called "*erosio papillaris.*" Again, if the surface is flatter, and more columnar epithelium is cut off in the deeper parts, it is called "*erosio follicularis.*" But these old distinctions are not clear, nor are they ever separated in a typical case, so the characteristics of erosion mentioned before are better; namely, the covering of a part of the cervix, normally covered with squamous epithelium, with columnar epithelium which dips more or less deeply into the

* *Brit. Gyn. Jour.*, Nov., 1895.

connective-tissue stroma; and characteristic also of "erosion" is it that this part of the connective-tissue stroma, which is normally free from glands, has a number of gland-like bodies produced in it, concurrently with the covering of its surface with cylindrical epithelium.

'There are also, no doubt, cancerous erosions, but in the opinion of many Continental writers the relations of erosions to cancer have been much overrated. Usually, in the cases in which the "erosion" appearances described above are seen, there will be no cancer found.'

Causation.—Erosion of the cervix, with cervical catarrh, is perhaps the most common of all the diseased conditions of the uterus which we are called on to treat. This does not surprise us, when we remember that it may attend on all the other congested states of the uterus and cervix that we meet with in practice: as, for example, endometritis, displacements, lacerations of the cervix, and vaginitis. We find it present in tubercular, syphilitic, and strumous constitutions. It may be induced or aggravated by the use of a pessary. I feel certain that this latter habit acts more frequently as an exciting cause than is generally thought.

Symptoms and Physical Signs.—These will in great measure depend upon the degree to which the uterus is involved in any coexisting disease, such as endometritis, hyperplasia, vaginitis, gonorrhœal infection. Coloured leucorrhœal discharge, pain when walking or standing, lumbar and sacral pain, dyspareunia, general lassitude, inability to undergo fatigue or any exertion, and loss of appetite, are among the symptoms most frequently complained of. On digital examination, the os uteri feels soft and moist, and the granular or eroded surface is felt by the finger. The os uteri and adjacent cervix are seen covered with a creamy discharge, perhaps tinged with blood. When this is wiped off with a little cotton-wool, the underlying eroded or granular surface is seen. Frequently there is a fissure of the cervix, the result of an old laceration. The os and cervix bleed readily when they are wiped with a sponge or wool. If endometritis coexist, the characteristic discharge issues from the os uteri. If there has been gonorrhœa, the uterine discharge is purulent, of a dirty yellow colour, covering like a layer of discoloured cream the surface of the wool. It has a slight fœtor. In these cases also there is accompanying vaginitis, and probably, if the disease be chronic, an accompanying granular condition of the vagina.

Treatment.—There are some general hints regarding the treatment of erosion of the cervix I think it well to press on the surgeon:—

Give a guarded opinion in reply to the question of the patient or

friend, as to the length of time a severe erosion or granular condition of the cervix will take to heal. The affection, especially if there be any coexisting disease of the uterus, must be tedious.

A fair judgment of the tendency to cure may be formed from the subsidence of the villous projections; the disappearance of granulations; the paleness of the exposed surface, and its diminished vascularity; the tendency to skin over; the diminution of discharge.

There is a danger of *over-treating* this affection by too frequent use of caustics or astringents. The strength of every application must be regulated by the severity of the case, and determined by the surgical instinct of the practitioner. No routine rule of using this or that strength of any agent should be followed.

Place as much reliance on physiological rest and soothing applications as on local medication.

Do not pronounce the case *cured* until the surface has completely healed and the patient has been subsequently under observation for a short time.

When a patient presents herself with an eroded cervical surface, the first point for the surgeon to determine, and on which not a little of his future peace of mind and the satisfaction of his patient depend, is to what extent the canal of the uterus is involved in the inflammatory process. This will demand a careful examination of the uterus and of the discharge which is present. Should he suspect that endometritis to any extent complicates the erosion, the uterine canal should be forthwith dilated, and the endometritis treated. There is no use in temporizing by repeated dressings with eroded states of the cervix, or to apply caustics to the external os if there be an endometric discharge left to cause irritation of a partially healed surface. It will generally be found that the most satisfactory plan is not to dally over various topical applications, but to at once proceed to dilate the cervical canal, and treat the endometrium as far as it requires to be dealt with, making at the same time a careful application of nitric acid to the eroded patch.

This treatment should be followed by systematic dressings up to the next menstrual period, and, after it has passed over, another inspection of the uterus should be made, and any spots that remain unhealed should be redressed with the acid.

If the uterus be displaced, it is wiser not to readjust it or perform a fixation operation until the erosion be healed, and a suitable pessary can be worn without risk.

General Management.—Rest in the horizontal position, avoidance of exercise, interdiction of all sexual intercourse, the administration of such tonics as quinine and arsenic, mineral acids and bark.

Vaginal Douches.—Some of the following agents added to the water: borate of soda, boric acid, sulpho-carbolate of zinc, acetate of lead, Condy's fluid, carbolic acid, alum, tannin (℥ss. of the borate of soda and ʒi. of one of the other agents added to a quart of water), perchloride of mercury ($\frac{1}{5000}$), liquid extract of hydrastis, chinosol, vasol iodine.

Topical Applications.—Nitrate of silver (the fused sticks before referred to, or the solution in different strengths); carbolic acid and glycerine; nitric acid; Richardson's styptic colloid; pigment of iodine and ichthyol (iodine ʒi., rectified spirit ℥i., ichthyol solution in glycerine 5 to 10 per cent., flexile collodion ℥ss.); chromic

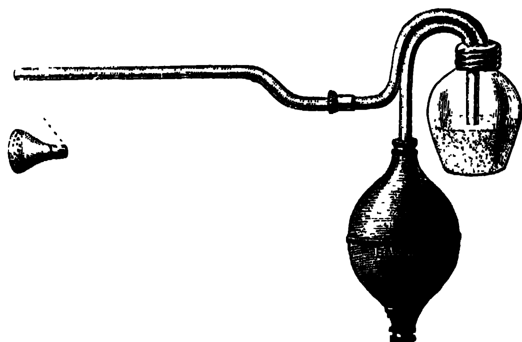


Fig. 290.—Author's Vagina, Uterine, and Operating Insufflator.

acid (ʒi.—℥i.); iodoform; perchloride of iron solution (ʒi.—℥i glycerine); chloride of zinc (ʒi.—℥i.); liquid extract of hydrastis with glycerine; biniodide of mercury. This latter preparation is applied by first painting the eroded surface with perchloride solution, and immediately washing the surface with an iodide of potash solution, when the red deposit of iodide of mercury forms on the part.

Vaginal tampons of glycerine, glycerine and tannin, glycerine and boric acid, glycerine and hydrastis; glycerine, hydrastis, and ichthyol; iodine and glycerine, chinosol. As to ointments of any kind, I do not recommend them.

This appliance (Fig. 290) I had made for me for blowing any powder on the cervix, inside the cervical canal, and on the surface of the wound if required. The powder Loretin I have found of much service.

Scarification.—Much benefit may be derived by the abstraction periodically of a little blood with the uterine lancet.

Suppositories.—The best are those of belladonna, opium, cocaine, acetate of lead, tannic acid, oxide of zinc, and iodoform.

FOLLICULAR DEGENERATION.—Three pathological conditions of the os uteri and cervix are closely allied to each other, both in their etiology and histology; these are—follicular degeneration, follicular hypertrophy, and mucous polypi. All three are sometimes associated with either a congested, eroded, or lacerated cervix, and eversion or 'ectropion' of the lips of the os uteri. Congestion and hyper-distension of the glands of the cervix (ovula Nabothi) lead to a general cystic condition, and the cysts either rupture, or through hypertrophy of the subjacent tissue are forced forwards in the form of polypi, or form, in the external vaginal surface of the os uteri, gray or yellow cystic projections, which frequently have purulent contents, but are more usually filled with colloid matter. Sometimes the collapse of the follicle is followed by a depression on the surface of the cervix. This little pit slowly disappears. The contents of the cysts are granules, mucous corpuscles, and epithelial cells; they are lined by a basement membrane (Farre). If the cystic degeneration of the follicles of either one or both lips of the os should proceed unchecked, and there be increase in the connective tissue of the cervix, a state of general trophy ensues, attended at times by fungous growths. This 'follicular hypertrophy' (Schroeder) of the cervix we thus see commences in follicular degeneration and cyst-formation; the polypoid character of the cystic growth being, in this instance, prevented by the investing and resisting epithelium of the vaginal surface of the cervix. Mucous polypi are found rather in elderly multiparæ.

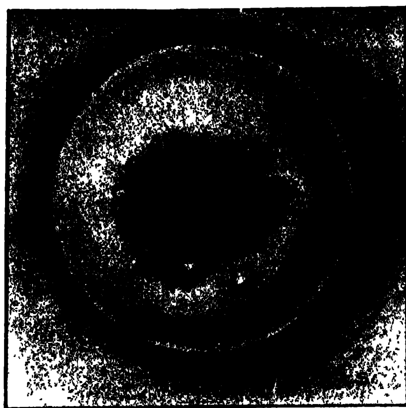


FIG. 291.—FOLLICULAR DEGENERATION AND EROSION WITH SLIGHT LACERATION. (Author.)

Diagnosis.—The presence of the numerous small cysts, and the nature of their contents; the appearance of the characteristic polypus protruding from the os; the soft, cystic-looking, and

enlarged lip, will readily distinguish the three conditions. Should a cyst rupture, and an apparent ulcer form, this softened state of the cervix might be mistaken for malignant ulceration. Such an error I have known committed in a case in which I subsequently ablated one lip of the os for cystic hypertrophy.



FIG. 292.—SHARP CURETTE. (Simon's.)

Treatment.—Cysts must be opened and curetted, or the contents evacuated, and chromic acid, carbolic acid, or nitric acid applied to the cavity. A mucous polypus must be removed with scissors or forceps. If we suspect the presence of small polypi inside the cervix, the canal is dilated, and resort had to the curette, forceps,

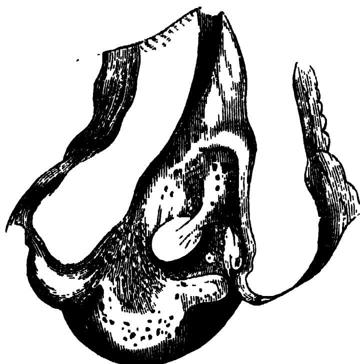


FIG. 293.—FOLLICULAR HYPERTROPHY OF THE CERVIX—SECTIONAL VIEW. (Pozzi.)

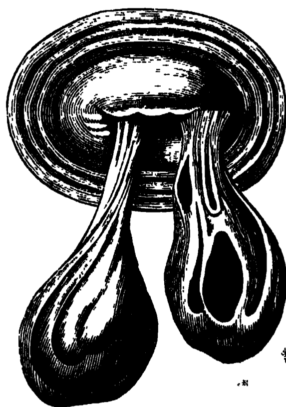


FIG. 294.—MUCOUS POLYPI GROWING FROM THE INTERIOR OF CERVIX, FOLLOWING FOLLICULAR HYPERTROPHY. (Pozzi.)

or long scissors for their removal. Nitric acid or chromic acid may be used to destroy very small polypoid projections into the canal. In very obstinate cases of cystic degeneration and follicular hypertrophy, the diseased vaginal portion of the cervix may require ablation. (*Vide* Amputation of Cervix, p. 297.)

CHAPTER XVIII.

PERIMETRIC INFLAMMATION AND PERI-UTERINE PHLEGMON.

THERE are three localized forms of inflammation, which might well be considered in connection with each other under the heading of *Perimetric Inflammation.* These are—

1. Perimetritis.
2. Ovaritis.
3. Salpingitis.

Two of these, ovaritis and salpingitis, are placed in this work under the portions devoted to affections of the ovaries and Fallopian tubes. The student can read of them in connection with other forms of pelvic inflammation.

PERIMETRITIS.—By perimetritis we mean inflammation of the pelvic peritoneum, and limited to it.

As regards *clinical differentiation between perimetritis and parametritis*, we must abandon any theoretical distinction which, on anatomical grounds, has been drawn between these conditions. I am in full accord with Emmet and others, who declare that clinically this theoretical distinction disappears, and that it is impossible (at least in the majority of cases) 'to make any distinction at the bedside.' I believe that it is better clinically to retain the term perimetritis alone, and include under this head all secondary inflammation in the cellular tissue in the neighbourhood of the uterus. This may primarily occur between the layers of the broad ligaments, between the bladder and uterus, between the vagina and posterior wall of the uterus. The cellular tissue around the neck of the uterus may be the original seat of the inflammatory effusion or phlegmon, but as a consequence we frequently have salpingitis, ovaritis, and different degrees of pelvic peritonitis, with effusions, occurring in Douglas' pouch. On the other hand, the inflammation may commence in the peritoneal

folds of the pelvis, anteriorly or posteriorly, and effusion may occur primarily inside the peritoneal cavity, as it commonly does in the pouch of Douglas. Here cellulitis is a secondary result of the pelvic peritonitis, and both the serous linings or folds and the cellular tissue of the pelvis are alike involved in the inflammation and resulting effusion. The secondary peritonitis may be as limited or localized in the case of the primary cellulitis, as the secondary cellulitis is in the instance of the primary peritonitis.

Hardon has drawn a distinction between true cellulitis and the fulness and hardness due to the turgescence and engorgement of the large venous sinuses in the broad ligaments consequent upon pressure and dragging of the uterus. Proper elevation of the uterus relieves this congestion. This venous engorgement points to the facility with which, in such cases, operative interference (Emmet) occasionally leads to phlebitis and septic sequences.

The relation of pelvic cellulitis to peritonitis is a matter of extreme importance. Does the cellulitis precede the peritonitis, or *vice versâ?* Polk first,* from a series of observations made by him in the Bellevue Hospital, argued that peri-uterine inflammation is a product of salpingitis, that the cellulitis is secondary to the peritonitis. This is the view advanced in previous editions of this work. Cullingworth, in an interesting article,† declares himself in favour of Polk's view. This is the attitude of the majority of modern gynæcologists to this question.

I am quite in accord with the statement that 'the inflammation in the great majority of cases begins in the mucous membrane of the uterus, either from septic absorption or the poison of gonorrhœa,' or from other infective cause. I have already urged this view in dealing with the course of metritis and endometritis. Pain is often absent in perimetric inflammation until the peritoneum is attacked. And the sound clinical axiom, that 'neither a *clean* wound nor a *clean* sound ever produced cellulitis' (the italics are the author's), is one I thoroughly endorse, and it places in its proper light the responsibility resting on the shoulders of every practitioner who uses the uterine sound, to see that the sound itself, and the vagina of his patient, are free and clean from any infective organisms before the instrument is passed into the uterine cavity.

'Adhesive perimetritis,' says Matthews Duncan, 'is almost certainly second in point of frequency among the diseases of women, the first position being held by uterine cervical catarrh; in post-mortem examinations of women no pathological condition is more frequently discovered than adhesions between the internal genital organs and neighbouring parts, especially about the ovary.'

* *Transactions of the Association of American Physicians*, 1866.

† *British Medical Journal*, Dec. 27, 1890.

Any one, who, like the author, has spent a considerable number of years teaching in an anatomical theatre, and who has been engaged in making dissections of the female pelvic viscera, will verify this conclusion. 'I do not exaggerate,' says Emmet, 'when I assert that pelvic cellulitis is by far the most important disease with which woman is afflicted.'

Causation.—Perimetric inflammation is constantly associated with acute metritis and endometritis; ovaritis; salpingitis; septicæmia; pyo-salpinx; arrest of menstruation (due to the effect of cold); abortion and parturition; operations on the uterus and vagina; the passage of the uterine sound; the use of tents; gonorrhœa; imperforate hymen and concealed menses; ovarian cysts; uterine fibroids; tubercle; cancer.

Micro-organisms in Pelvic Suppurations.

Cases have been recorded by Hartman and Morax,* showing that acute aseptic peritonitis may occur. No micro-organisms could be discovered in the sero-fibrinous fluid that was examined. The same authors† showed that cases of catarrhal salpingitis, hydro-salpingitis, retro-uterine hæmatocele, with fever, may occur without the presence of micro-organisms. The same is true of a number of cases of suppuration of the adnexa, but in a large proportion of the latter streptococci and gonococci were found.

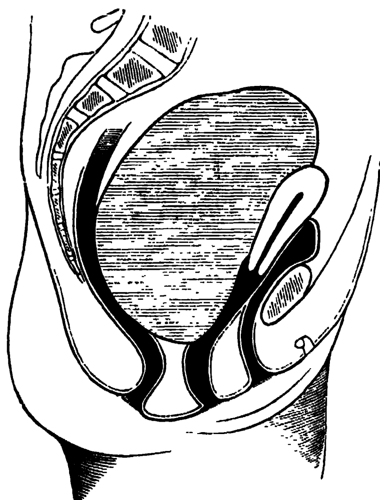


FIG. 295.—COLLECTION OF SERUM IN THE PERITONEAL CAVITY PERIMETRITIS SEROSA. (Schroeder.)

In the pus of suppurations of the adnexa are found the streptococcus pyogenes (the infective bacterium of puerperal septicæmia); the gonococcus; the bacterium coli commune; the staphylococcus aureus; the bacilli of tubercle, and the cladothrix of actinomycosis. (See chapter on Bacteriology.)

Pathology.—The division of perimetritis (Matthews Duncan) into three kinds—adhesive, serous, and purulent—answers all practical purposes. In the first variety

* *Anal. de Gynæcol.*, xli., p. 193, 1894; Schmidt's *Jahrbücher*, Band 245, 1894.
† *Rev. de Chir.*, p. 348, 1894.

there is an exudation of plastic lymph from the engorged and turgid peritoneal vessels. This results either in temporary adhesions between the pelvic viscera, or in permanent adhesions which remain for the lifetime of the individual, causing dragging and displacement of the ovaries and Fallopian tubes, binding these down, or connecting them with each other. These adhesive bands or membranous layers may shut off a collection of pus or serum, forming cyst-like cavities. Such an accumulation is shown in Fig. 295.

In the serous and purulent varieties an exudation of serum or pus occurs into the peritoneal cavity, and, naturally, first collects in the most dependent situation, which is Douglas' pouch, pushing upwards the coil of intestine which is contained in it when the bladder and rectum are empty. The serous fluid, as it increases in quantity and becomes harder, may press the uterus forwards against the pubes. At other times the exudation occurs at the sides of or all around the uterus, and it may rise over the fundus of the uterus above the pelvic brim into the abdominal cavity. A limited collection of serum or pus may form between coils of intestine; this, after absorption or rupture, may leave adhesions and inflammatory thickening of the peritoneum. The quantity of pus which thus collects in the peritoneal cavity is very large; take, for example, the following case, reported by me as far back as the year 1881. The drainage after treatment then adopted, so different to that which is followed to-day, affords one of the many instances of the advance in gynæcological surgery.

J. C., aged 32 years, was admitted into the hospital with a history of pelvic peritonitis after parturition. The pain and enlargement commenced a week after labour. There was enormous distension on admission. The patient was aspirated on the 16th, and over *nine pints of pus* drawn from the peritoneal cavity. This quickly re-secreted, and *five pints* more were taken to relieve the sense of hyper-distension and consequent uneasiness. Eleven days subsequently the abdomen was opened antiseptically; all the pus was evacuated through an incision of about two and a half inches. The peritoneum was greatly thickened; it was hooked carefully up and held in contact with the abdominal parietes; then a Keith's glass drainage-tube was passed and held in position in the wound by sutures; the peritoneum was stitched from within to the abdominal wall as in ovariotomy; a drainage-tube with a wire coil inside was attached to the glass tube, its other end resting in a bucket of carbolic water, which was placed at the side of the bed. The pus drained into this for nearly three weeks. The glass tube was taken out each day, and the wound was dressed, the orifice carefully cleansed, and the rubber tube well washed out with carbolic solution, the end of the tube being corked under the carbolic water whenever the latter had to be changed. Suffice it to say that

the patient lost, at the lowest calculation, some forty pints of pus while in hospital. For the last five weeks the opening was kept patent to secure drainage by a bunch of carbolized horse-hair carried well into the cavity. The discharge gradually ceased. A hard mass filling the pelvic brim remained. This finally disappeared. The woman became quite strong and well, had a good appetite, and was only anxious to leave the hospital. During my absence from home, the patient, having been up and out for several days, suddenly complained of pain; symptoms of collapse set in with intense pain and vomiting, and she died in twelve hours from the onset of the symptoms. The house-surgeon made a post-mortem examination, and found that a recent rent had occurred in the pelvic peritoneum, through which a small quantity of fetid pus escaped into the general peritoneal cavity; adhesions had formed which protected the bowels, but the peritoneum was greatly thickened in parts. A funnel-shaped canal led up to the abdominal opening, and some fetid pus was found at the side of the uterus. I regret much my absence from the autopsy of this most interesting case. The patient lived four months from the date of the abdominal section.

Some years since, I saw a girl, aged eleven years, with Dr. Bastable. The abdomen was distended with fluid. Some pus was oozing from the umbilicus. I passed in an aspirator and drew off about a pint of pus. The next day, under ether, I made an opening into the peritoneum, drew up its margins, and fixed them to the abdominal wall with sutures, first evacuating a large quantity of pus with the aspirator. I then passed a Keith's drainage-tube downwards towards the pelvis, to the other end of which was fixed a tube draining into water, the tube being fixed in with cross-straps of adhesive plaster, and the entire abdomen covered with antiseptic dressings, which were used all through. When the fluid was drawn off, a suprapubic mass was detected. This completely disappeared as the child got better. For three weeks the drainage-tube was retained. Dr. Bastable estimated the quantity of pus drained from this child at eleven pints. She made a perfect recovery.

Since I published the details of these cases the treatment of large pelvic abscess and suppurative peritonitis has considerably advanced, cœliotomy and free flushing out of the peritoneal cavity with an antiseptic solution being regarded as the most efficient mode of treatment.

The late John Wallace exemplified, by a series of cases, the advantage of the treatment of collections of fluid in the peritoneal cavity by opening and drainage with antiseptic precautions. Two of his diagrams I insert to show the extent to which such fluid collections may reach and yet be cured.

The abscess may open into the rectum, the vagina, the bladder, and, very rarely, into the uterus. It may point in the groin, the upper part of the thigh, in the region of the sciatic notch, or in the lumbar region. I have seen cases which have burst into the rectum, vagina, bladder, and the groin.

A sudden escape of pus into the general peritoneal cavity is, as

a rule, followed by fatal peritonitis, or septicæmia. Rarely, absorption of a large collection of fluid takes place, and the patient

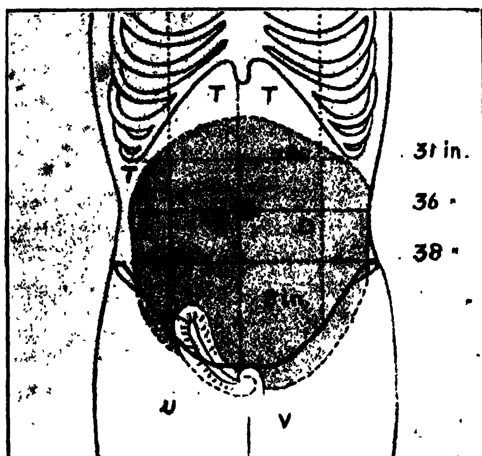


FIG. 296.—Line of incision exposing anterior layer of broad ligament, with numerous vessels distributed over it; T, T, T, tympany; D, dulness; U, uterus displaced to left, fixation partial. Cured by abdominal section and drainage. (Wallace.)

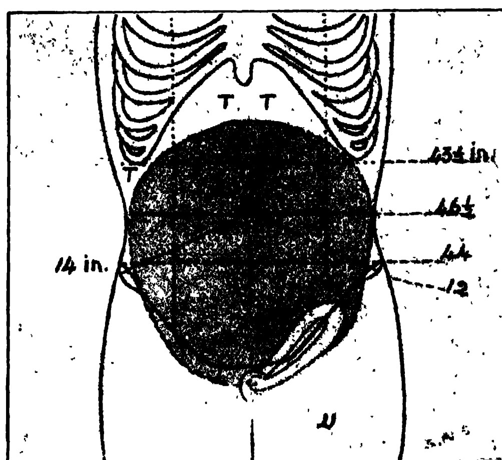


FIG. 297.—D, dull area of tumour; T, T, tympany; U, uterus displaced downwards and to right behind tumour; V, fixed with tumour to pelvic walls. Cured by abdominal section and drainage. (Wallace.)

returns to health; this, however, is generally a very slow matter, and involves great anxiety, nor does it happen without leaving

some exudation or adhesion, which often feels like a circumscribed tumour in the pelvic roof.

Clinical experience teaches this lesson, that it is not right in these cases to continue for any length of time an expectant plan of treatment. There is always the risk of septic absorption, of secondary degenerations in the ovaries and tubes, and various imprisonments of fluid effusions in the broad ligaments and elsewhere. Matting of the pelvic structures occurs. The pelvis may be explored when it is too late to do any good by operation, and when cœliotomy is worse than useless. This sad evidence of a policy of 'waiting on events' is unfortunately too often seen as a consequence of timidity or sanguine reliance on the *vis medicatrix naturæ.*

Symptoms and Physical Signs.—The symptoms will depend on the nature of the inflammation, whether it be acute or chronic. In acute pelvic peritonitis there are generally rigors, high temperature, rapid pulse, coated tongue, some gastric disturbance, vomiting. The symptoms are accompanied by abdominal pain, tenderness, and tympanites. On examination the abdomen is found very sensitive to pressure; the vagina is hot, perhaps swollen, and we may, comparatively early in the attack, be able to define a fluctuating swelling in the posterior vaginal cul-de-sac, or laterally through the vaginal roof. These signs of the affection are soon followed by the characteristic one of *fixation of the uterus.* There is a hard 'board-like' feeling (Doherty) anteriorly or posteriorly, the effusion displacing the uterus, or encircling it. Should the disease run an unfavourable course, the symptoms of septicæmia or general peritonitis set in; the vomiting increases; the temperature rises to 105° or 106°; the pulse is rapid and wiry; the countenance becomes more anxious; abdominal pain with tenderness and tympanites increases, and delirium sets in. In other instances the perimetritis is far more insidious in its onset, and the symptoms are so obscure that no local examination is made until the exudation is discovered, and it fills Douglas' space and fixes the uterus.* Persistent abdominal pain varying in severity, or some pelvic distress either in the bladder or rectum, first calls for an examination, and the swelling is discovered. Such cases may run on for some time before advice is taken, often as much for the loss of appetite and wasting as for the local distress.

Many a case is assumed to be one of threatening typhoid, or some 'gastric' disturbance with hyperpyrexia, and is treated

* See chapter on Salpingitis and Pyo-salpinx.

accordingly, until the more pronounced local symptoms and signs, arouse suspicion, attention, and examination.

APPENDICITIS.

In the onset of the inflammation an attack of appendicitis is not uncommonly mistaken for pelvic peritonitis. There is some excuse for this in the severe pain which is complained of low down in the iliac region, and the rise of temperature. The sickness, the intense inguinal pain, the sensitiveness and the swelling in this region, the constipation, the tendency to tympanites, the greater general distress, the history of previous attacks, and the negative evidence afforded by a vaginal and rectal examination, the chance of such an error being remembered, should not leave any doubt as to the presence of the bowel complication. I cannot refrain here from urging the gravest need for caution in arriving at an early diagnosis of these cases of appendicitis and typhlitis, or perityphlitis. I have seen some most regrettable and fatal errors made in this respect. It must be remembered that the symptoms in some cases of appendicitis, if they be obscure in the first instance, run on very rapidly after some forty-eight hours, and operative assistance may thus be deferred until it is too late.* Of all the acute inflammations occurring in the abdomen or pelvis, that which involves the greatest responsibility, if an expectant or temporizing attitude be assumed, is appendicitis.

In an able communication on this subject, James Swain † divides appendicitis into four forms—simple, plastic, suppurative, and relapsing. He makes with reference to the last these important remarks:

'The next variety—that of rapidly perforative or fulminating appendicitis—is more common in young people, and is the most fatal of any form of appendicitis. Its seriousness is shown by the fact that in at least 75 per cent. of perforative cases it was the *first* attack which was accompanied by the perforation. The strangulation of the appendix in the way already explained is most complete, and rapidly runs on to grangrene of its walls, which then become perforated, with the rapid diffusion of the septic contents over the peritonéal cavity. Perforation does not usually occur until the second or third day, being preceded by the general and local pains and vomiting, as in other varieties. The temperature is not at first much raised. With the onset of perforation the symptoms assume all the gravity of an acute general peritonitis. The pain, especially in the right iliac fossa, is more intense, and rapidly spreads over the whole abdomen, the vomiting becomes incessant,

* *Bristol Medical Journal*, March, 1894.
† *Ibid.*, March, 1894.

constipation is practically absolute, and the pulse is small and frequent. The general symptoms are at first those of shock, and the temperature may be low, although it subsequently rises to 102° or more if the patient should live for any length of time. The abdomen is at first retracted, and the abdomina muscles very tense, but later on there may be general abdominal distension from paralysis of the intestines. The face bears the usual anxious expression of acute abdominal disease. The patient may die in a day or two, apparently from a general septic condition, before much suppuration has occurred; in some cases she may drag on for a fortnight or more, but eventually she dies of a general suppurative peritonitis. According to Fitz,* 98 out of 176 cases died in the first week.'

I am indebted to Alfred Smith, of Dublin, for the particulars of this most interesting and instructive case which I here record, as it exemplifies so many points in the operation of cœliotomy.

Colectomy for Adhesion of Cæcum to Old Ovarian Pedicle and Tubercular Appendix.

Abdominal section was performed on October 11, 1892, when a right ovary, enlarged to the size of a billiard-ball, was removed along with the Fallopian tube quite close to the uterus. Shortly after the pain in the right inguinal region returned, and became so intolerable that the patient presented herself again, imploring relief by operation. Accordingly, on May 24, 1893, the abdomen was opened. The intestines did not fall away, and could not be pressed aside. The cæcum was adherent to the old pedicle by a very dense and intimate adhesion. The left ovary, which had increased to the size of a hen's egg, was removed along with the Fallopian tube close to the uterus. At first there was temporary relief after the operation, but soon the old dragging pain returned with renewed intensity, especially at night.

On November 29, 1893, the abdomen was again opened. There was a slight omental adhesion along the track of the old incision; the omentum and the small intestines had become anchored to the pelvic organs by fine adhesions. There was some difficulty in getting the adherent pedicle well into view, but eventually it was brought well up to the abdominal incision.

The adhesion was separated—pus welled out, which was mopped up with moist corrosive wool, and the separating process was continued, revealing an extensive ulcerating cavity, formed by the end of the old pedicle, a portion of the wall of the cæcum and the vermiform appendix. The ulcerating surfaces were disinfected with corrosive sublimate solution, 1 in 1000. The pedicle was short, quite close to the uterus; it was swollen to the size of the last phalanx of the thumb. Many large veins could be seen, concealing the ulcerating surface like a monk's cowl. The old silk ligatures lay quite loose, and were apparently unchanged. The substance of the stump was very rotten. It was transfixed with a stout thick ligature and tied, and the ulcerating surface was cut away.

The vermiform appendix was quite turgescent, like a semi-erect penis, and

* *Am. J. M. Sc.*, vol. xxii., 1886, p. 321.

pulsated regularly, the rhythm synchronizing with the pulse. It was eaten away by an ulcer of tubercular character, and its stem was greatly thickened. Two oblique incisions were made through its peritoneal covering, and the peritoneal layer was peeled back. The central portion was then amputated. The tops of the two flaps were next inverted, and brought together by two No. 4 silk sutures. The ulcer on the cæcum was the size of a florin, with undermined edges. It was tubercular. The ulceration penetrated as far as the submucous tissue. The entire ulcerating surface was snipped off with a scissors, leaving healthy tissue on all sides. The submucous tissue was brought together by a purse-string suture, and the muscular layers by interrupted silk sutures taking in the edge of the peritoneum, and finally

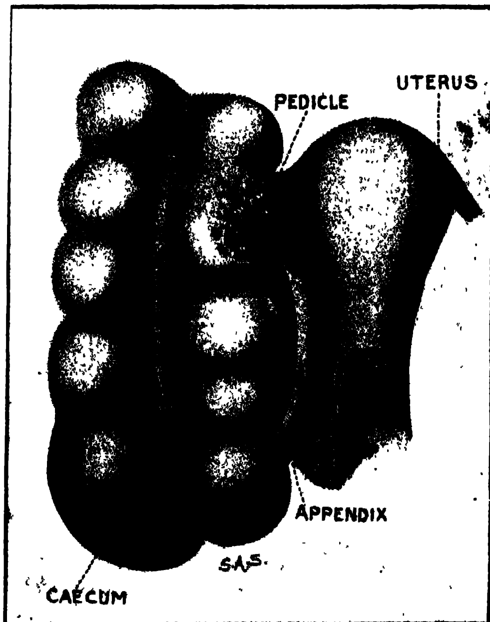


FIG. 298.—SHOWING ADHESION OF OLD PEDICLE OF REMOVED ADNEXA ADHERENT TO CÆCUM AND APPENDIX.

the peritoneum by Lembert's sutures; the pelvis was dried, and a drainage-tube was inserted.

About three hours after the operation the patient's temperature fell to 97° F., pulse 110, and the dressing was soaked with blood. A quantity of dark blood was aspirated. Very persistent and excessive vomiting set in, and was accompanied by violent abdominal pain. Morphia was given hypodermically. On the effects of the morphia passing off, vomiting again returned. About nine p.m. symptoms of collapse set in, with severe abdominal pain. Evidently the pedicle ligature had slipped. She was too weak to remove from the bed; the abdomen was reopened as she lay. Blood welled up in

quantities. By digital compression the hæmorrhage was checked, while the large blood-clots were rapidly removed. The silk ligature had cut through the rotten pedicle, and was hanging on to a shred. Hæmostasis was accomplished by transfixing part of the uterine wall with a silk ligature, and tying in two bundles, while separate ligatures were put on the vessels. The intestinal suture in the cœcum was then examined, and found to be well glazed. The abdomen was flushed with a warm saline solution, and a drainage-tube was left in. It was removed on the fourth day. The patient's recovery was rapid and uneventful.

This case illustrates—

1st. The value of drainage.

2nd. The rapidity of glazing after suture of the intestine.

3rd. The facility of suture by the purse-string and Lembert's method.

4th. That after copious hæmorrhage death may be arrested by prompt treatment.

5th. The necessity for careful examination of the vermiform appendix in cases of persistent right-side pain.

Prognosis.—Perimetritis is always a dangerous and serious affection. The principal dangers are: general peritonitis, phlegmon of the pelvic cellular tissue, pelvic abscess and septicæmia, metritis, uterine displacements, and, as secondary results, limited organized effusion, adhesion, atrophic states of the ovaries, obliteration of the tubes, dysmenorrhœa, and sterility.

Treatment.—In speaking of treatment, from what has been said on the subject of dilatation and curettage, it will be readily gathered that the immediate steps to be taken in a case of pelvic inflammation will entirely depend on the cause of the affection and the complications that are met with. In the acute stage the management of the later developments will depend on the course the inflammation has followed and the pelvic developments: opium in grain doses; an ice-bag on the abdomen; the application of Leiter's temperature-regulators; leeches to the hypogastrium; enemata; relief of the bladder by the catheter, if necessary.

In chronic cases, careful regulation of exercise; avoidance of chills and exposure to cold; great care at the menstrual periods; rest in bed, if there be periodical exacerbations of temperature and swellings; sexual intercourse should be prohibited. The patient may be treated with warm hip and iodine baths, applications of iodine externally (iodine pigment, made of iodine, ʒi., mastich ʒi., rect. spt. ℥i.), warm compresses, the hot vaginal douche, with laudanum added to the water. A few leeches, when the patient is threatened with recurrence of attacks, may be applied near the anus or in the vaginal region. The bromides, with iodide of

potassium, are indicated; and, if sickness occur, such medicines as oxalate of cerium, bismuth, hydrocyanic acid, chloride of calcium, or effervescing mixtures of bicarbonate of soda and potash, may be given. On the whole, some dry champagne, or small doses of brandy, with soda or seltzer water, are perhaps the best stimulants to select. Any stimulant should be given in very moderate quantities, and abandoned when the occasion for its employment has passed.

Operative Interference for Pelvic Suppurations.

Analyzing the views of Bouilly, Sänger, and Howard Kelly * on the treatment of pelvic suppurations, we find the first-named authority classifying the indications for operative interference as follows:—

(*a*) Cellular abscesses, perimetritis, peri-uterine phlegmons.
(*b*) Abscesses of the ovaries or the tubes, pyosalpingitis and suppurating ovaritis.
(*c*) Primitive peritoneal abscesses, pelvic peritonitis, suppurating hæmatocele.
(*d*) Simultaneous suppurations of various pelvic organs constituting purulent collections, or complicated with fistulæ, bursting either through the skin, or in the neighbouring cavities, or in various places at the same time.

Bouilly divides the three principal methods of treatment thus:

(*a*) Incision followed by drainage through the abdominal or vaginal wall.
(*b*) The opening or ablation of the suppurated cavities by laparotomy.
(*c*) The opening or ablation of the suppurating cavities through the vagina, by means of previous vaginal hysterectomy with or without morcellation of the uterus.

Howard Kelly enumerates four principal modes of dealing with pelvic inflammatory disease:

1. Puncture per vaginam.
2. Conservative operative treatment.
3. Simple salpingo-oöphorectomy; occasionally associated with excision of one cornu uteri.
4. Hystero-salpingo-oöphorectomy.

Sänger gives the following comprehensive classification of all operative procedures:

1. Operations through the vagina.
    (*a*) Anterior colpocœliotomy (Dührssen, A. Martin, etc.).
    (*b*) Posterior colpocœliotomy (Atlee, Hégar, Battey, Byford, Laroyenne, L. Landau, Mackenrodt, and others).

* *Geneva Medical Congress Proceedings*, 1896.

(*c*) Anterior and posterior colpocœliotomy (Bode, von Erlach, Gottschalk), all combined with uni- or bilateral salpingo-oöphorectomy.
(*d*) Colpohysterectomy (uterine castration of Péan).
(*e*) Colpo-hystero-salpingo-oöphorectomy, 'radical operation through the vagina' (Péan, Segond, Doyen, E. Landau).

2. Abdominal operations.
(*a*) Uni- or bilateral cœlio-salpingectomy and cœlio-salpingo-oöphorectomy.
(*b*) Total cœlio-salpingo-oöphoro-hysterectomy (radical abdominal operation, Krug, Polk, Delagenière, Schauta, Bardenheuer, etc.).
(*c*) Bilateral cœlio-salpingo-oöphorectomy combined with supra-vaginal hysterectomy (Zweifel, H. A. Kelly, Sänger).

3. Abdomino-vaginal hystero-salpingo-oöphorectomy, commenced most often through the vagina, and ended by the abdominal section (L. Landau).

4. Sacral or parasacral cœliotomy (Hégar, von Hochenegg, Czerny, Schede, and others). This operation is performed only by a few surgeons in rare cases.

Bouilly then points out that in acute pelvic abscess and primitive peritoneal connections, as also in encysted abscess of the appendages, incision, followed by drainage, frequently cures, and that vaginal punction does not interfere with the subsequent hysterectomy, if such a step be demanded. The unilateral or bilateral character of the adhesions, the height in the pelvis to which the purulent collection extends, the degree of adhesions of a suppurating sac to the uterus, must be the principal guides to the choice of one of the two steps, cœliotomy or vaginal hysterectomy. The latter operation has the advantage of being more radical in character, and provides more perfect drainage, while the utero-adnexal castration affords the most complete protection against any associated subsequent complications.

Puncture through the Vagina.

Howard Kelly urges the low mortality of the treatment by puncture through the vagina, and the freedom from the dangers and risks inseparable from the major operations. The dictum of so fearless and experienced a surgeon is worthy of note:—

'*In young married or unmarried women, in the case of girls who have not come to maturity, even seriously diseased organs should not be removed, until every other means of cure has failed.*'

As I have already emphasized in the text, no possible precaution must be overlooked both before, during, and after an exploratory or evacuation operation, regarding asepsis of the vagina.

The rectum, bladder, uterine arteries and ureters, have to be

carefully avoided. Should the peritoneum not have been opened, the abscess cavity is irrigated with sterilized solution of chloride of sodium or weak iodide. I wipe out the cavity with mops of sterilized iodoform, or damp chinosol gauze, and then drain with iodoform gauze or a soft sterilized tube.

In pyosalpinx I lean to the side of early salpingo-oöphorectomy, and, if the uterus be at the same time seriously involved, I have no hesitation in saying that the operation of hystero-salpingo-oöphorectomy is *theoretically* the classical one. Here the uterus and adnexa are removed. The operation often involves the greatest difficulty in consequence of adhesions and the septic state of the organs. Therefore, it is one in which no desire for speed can excuse incomplete asepsis and hæmostasis, abdominal and vaginal; the careful adjustment of the peritoneal edges and the provision for vaginal drainage. The operation is completely described in the chapter on hysterectomy.

On the question of drainage, Sänger gives the following indications for its indispensable employment:—

(*a*) Every time that virulent pus has contaminated the operator's hand or the unimpaired part of the abdomen.

(*b*) Every time that the hæmostasis is not perfect, especially when there is a discharge of virulent pus.

(*c*) In the case of the existence of a fistula before the operation, or of perforation of the intestine happening during the operation, or likely to happen afterwards. Every time also when fistulæ or perforations have been closed by the suture.

Sänger lays down the rule that cœliotomy is always indicated in large purulent collections and in suppurative cystic neoplasms, and the concert of opinion of German gynæcologists is distinctly in favour of ablation of all suppurated organs. This is the practice of A. Martin, the Landaus, and Schauta. The vaginal operation has gradually superseded the abdominal route in most of the Continental clinics. So much cannot as yet be said for Great Britain. A divergence of opinion still exists as between the radical operation through the vagina, and abdominal salpingo-oöphorectomy of hystero-salpingo-oöphorectomy. After contrasting the vaginal and abdominal operations, Sänger makes these remarks:—

The vaginal operation, perhaps less radical than the abdominal, is, however, infinitely simpler and far less dangerous in its execution; it must be considered as the one to be selected.

Every time that preservation is not indicated, the supra-vaginal cœlio-salpingo-oöphoro-hysterectomy will be the least dangerous radical operation.

It can even be performed while preserving parts of the ovaries (Zweifel).

In considering the cases in which a radical operation is indispensable, he himself prefers the abdominal method, and finally concludes:—

Advocates of the different operative methods should avoid claiming an absolute superiority for their own proceeding. Every appropriate treatment may be justified, and in each individual case it is far better to take into serious consideration the special advantages offered by each one of the methods.

Leopold, in advocating hystero-salpingo-oöphorectomy in chronic suppurative conditions of the adnexa, with associated diseased states of the uterus, refers to the conditions that indicate this radical step:—

(*a*) Where the patient is deprived of all enjoyment in life and capacity for work. (*b*) Where all ordinary and extraordinary therapeutic measures have failed. (*c*) When the pathological conditions include such states as the following: A retroflexed and adherent uterus, enlarged by chronic metritis and endometritis. Muco-purulent discharge from the uterus, or possibly periodical severe metrorrhagia. Salpingitis and pyo-salpinx, and diseased conditions of the ovaries. Such states are easily determined by a thorough examination.

Leopold thus enumerates the advantages of total extirpation by the vagina:—(1) The complete removal of the diseased organs, without leaving behind a still inflamed uterus as a focus of further mischief. (2) The wound is at the lowest part of the abdominal cavity, favouring drainage. (3) The operation field is readily accessible, even in the case of non-parous women, and in cases of large swellings of the appendages. (4) There is no abdominal wound, and the risk of ventral hernia is obviated. (5) The operation is much less dangerous than laparotomy; the intestines do not come into view; the soiling of intestines with pus is prevented, the operation is practically extra-peritoneal, and lastly, it is available for patients in such a weak condition that laparotomy would almost certainly prove fatal.

PERI-UTERINE PHLEGMON (PARAMETRITIS).—By the term 'parametritis' we mean a phlegmonous inflammation of the connective tissue of the pelvis.

Causation.—It occurs often in association with the puerperal states as the result of septic absorption. The proportion of cases of peri-uterine inflammation due to child-bearing, miscarriage, abortion, both criminal and other, is understated if we place these affections as furnishing over 50 per cent. of the causes.

It may also be due to traumatic causes, as operations on the uterus; the use of tents, intra-uterine stems, and medication; or follow upon ovaritis.

In a table of 146 cases, Emmet showed that 50 per. cent were complicated with versions or flexions, and over 17 with laceration of the cervix, the next most frequent association being a fibroid tumour of the uterus.

Pathological Anatomy.—The extensive distribution and connections of the cellular tissue of the pelvis explain the different positions in which the exudation occurs in parametritis. This may be in the layers of the broad ligaments behind the uterus and rectum, or extend upwards along the psoas muscle to the kidney or into the iliac fossa, and occasionally occur between the rectum and uterus, the uterus and bladder, and downwards into the cellular tissue of the gluteal region by the sciatic notch. The ovaries and Fallopian tubes are generally involved.

The stages of the inflammation are the same as those of phlegmon occurring elsewhere—(*a*) congestion, (*b*) effusion, and (if resolution do not happen) (*c*) suppuration. The inflammation may not pass beyond the second stage. With regard to the exudation, there are many degrees of intensity, from a slight swelling in either broad ligament to a considerable infiltration at both sides or in front of the uterus, leaving a hard mass that fills the entire upper part of the pelvis. The uterus is pushed to either side, out of position, or pressed downwards, forwards, or backwards. The effusion at first feels soft to the finger; it then gradually hardens, and if an abscess form, it again softens, and fluctuation may be detected. Though, in the commencement, the uterus is pushed to the opposite side, later on, when absorption has begun, it is *drawn to the side of the exudation* (Schroeder). This ultimate traction of the uterus to the side of the pelvis in which an old effusion has healed has an important bearing on diagnosis. It also explains the pain which is specially complained of in the contracted region through adhesion of the broad ligament or ovary of that side, and displacements and entanglements of the tubes, or compression of the ovary, especially at the left side, by the laterally drawn uterus against the rectum or pelvic wall. And the bilateral character of the pain is caused by the tension of the broad ligament of the opposite side, and the dragging of the ovary and possible stretching or torsion of the Fallopian tube. These are generally sad cases, for they are difficult to alleviate or remedy.

Diagnosis.—I have tabulated the most reliable points of distinction between perimetritis and simple phlegmon (see p. 388). The diagnostic traits, set down in tabular form, will help to differentiate these effusions from other swellings liable to be mistaken for them. Easy though it may seem to the experienced hand, it is not at all so simple a matter for the young practitioner to diagnose some chronic peri-uterine exudations, especially those

situated anteriorly or posteriorly, from fibroid tumours of the uterus. This arises when the tumour cannot be moved apart from the uterus, so that it is difficult to isolate it.

Symptoms and Physical Signs.—Acute phlegmonous inflammation is marked by the following symptoms: rigors, increase of temperature (102–104°), rapid pulse, pain in the hypogastrium, general febrile disturbance, rectal discomfort and constipation; the vagina during this stage is found to be hot and swollen, and there may be vaginal pulsation. Later on careful vaginal and rectal exploration will enable the examiner to detect, in some portion of the vaginal roof, or posteriorly in the utero-rectal space, a small painful swelling, the commencement of exudation.

[Pincus has supplemented the treatment of pelvic affections advocated many years since in this country by Heywood Smith (viz. placing the patient on an inclined plane with the feet raised), by constant pressure obtained internally, either by a colpeurynter, or tamponnade to which in certain cases gynæcological massage is added.*]

Later still, the 'board-like' feeling of the induration and the displacement of the uterus and its fixed position leave little room for doubt. The decubitus is more frequently to the affected side. There is a very characteristic symptom which occurs also in perimetritis—that is, retraction of the thigh. This happens when the iliac or psoas muscles are involved, and an abscess has formed, or is forming, in the neighbourhood of, or involving, the psoas muscle.

But perhaps the most vital fact for the practitioner to remember is the essentially chronic and insidious nature of the affection in many instances. It is not necessary that the patient should complain of any marked symptom which would attract the medical man's attention specially to the uterus or the pelvic genital organs. I have seen such cases where pelvic mischief was not even suspected, and yet had been for some months taking place. I had such a case, in which dysenteric symptoms completely masked those of cellulitis, and absorbed the attention of the physician. There had been, in the first instance, endometritis. The patient was unmarried. When I saw her, the uterus was quite fixed by an exudation, which surrounded it, and pressed the uterus back against the rectum, so that it occluded the cul-de-sac of Douglas; this explained the rectal distress.

Pain in walking, a throbbing sensation in the uterus, general

* *Zeitschrift f. Geb. u. Gyn.*, xxxix., 1899.

loss of health, some nightly rise of temperature or hectic, may be the only symptoms present in these chronic cases. Following on either the acute attack or the chronic form, there is gradual wasting and loss of weight, and, in some instances, emaciation. The patient is worn down by the suffering and the local distress. If the exudation should terminate in suppuration, and an abscess form, relief may rapidly be afforded through its bursting or the evacuation of the pus. Unfortunately, it occasionally happens that the pointing of the abscess is a matter of long duration; the pus burrows in the cellular tissue, and long sinuous channels form, through which it finds its way to the surface, and these render the case extremely protracted. Such a disastrous series of complications should not be permitted to occur, in the face of our present knowledge, by any surgeon.

The exudation may harden, and a solid tumour occupy some portion of the pelvis, producing both rectal and bladder distress by pressure on these viscera, and exhausting the patient through a slow process of absorption, prolonged over many months of unrest and suffering. If an abscess form, it may point in the rectum. bladder, vagina, or abdominal wall. Take two such examples as the following:—

A woman was admitted into hospital under my care with an exudation boarding up the entire roof of the vagina anteriorly, and producing great vesical distress. Shortly after admission, a quantity of pus suddenly appeared in the urine, and this continued for a considerable time; the pelvic hardness finally disappeared, and there was no vesical trouble.

I was called some years since to see a lady, exhausted from prolonged suffering from what I judged to be an attack of peri-uterine cellulitis with perimetritis. The patient was so weak that she fainted at the first attempt at a digital examination. She had not for many weeks had rest, save by the aid of bromide of potassium and chloral. I found a large tumour completely fixing the uterus. There was a slight uterine discharge. When the bowels were relieved, the greatest agony was suffered. There was limited peritonitis, with exudation, which could be traced almost to a level of the iliac crests. On the following day a speculum was introduced. I found a quantity of discoloured pus in the vagina; and on clearing this away, I saw that it was flowing rather profusely from the os uteri. For five weeks this purulent discharge continued, and it lasted, in smaller quantity, for ten weeks from the time I first saw her. She recovered; all hardness completely disappeared, and the uterus was quite normal in mobility. (Since this was first written she has been twice married.) This happy termination of such an extremely grave case is the great exception, not the rule.

In addition to the immediate dangers, from the inflammation

involving the peritoneum and causing general peritonitis, or the more remote risks that are inseparable from the presence of pus and the bursting of a pelvic abscess, there are the ultimate results, such as adhesions, atrophy of the ovary, occlusion of the Fallopian tube, sterility, uterine displacements, with amenorrhœa and dysmenorrhœa. It is not an affection in which we have so much to fear fatal consequences, as these chronic pathological and clinical sequelæ.

Treatment.—Most of what has been said regarding the treatment of perimetritis refers with equal force to peri-uterine phlegmon; rest in every way that it can be secured, and that for a considerable time; opium in the acute stages, and the regulation of the temperature by the application of ice, or Leiter's irrigator, which can be applied both externally and in the vagina. The hot vaginal douche, with a disinfectant in the water, used three or four times daily, and hot compresses or thin cataplasms applied externally and covered with oiled silk or protectine, are beneficial. Light vesication over the epigastrium is useful. The patient's strength must be sustained with a light and nutritious diet. In the chronic stages the iodides of potassium, strontium, or sodium, combined with bromides and tonics, may be given. In these cases of old and unabsorbed effusion, the patient should be placed on a course of perchloride of mercury and bark, or a pill containing percyanide of mercury (gr. $\frac{1}{12}$), quinine (gr. ii.), extract of gentian and bread-crumb (q.s.); one pill three times daily. If we except the plan of Apostoli of treating parametritis by electrolysis, nothing of material importance has been lately added to our methods of treating the earlier stages of this affection, and the general principles advocated in the text are those by which we must be guided. I may summarize the most important methods.

The various operative procedures that have been referred to in treating of pelvic suppurations are those to be adopted in suppurating pelvic phlegmon.

The constant and free use of the hot douche, to favour resolution and promote absorption.

Antipyrin, antifebrin, and phenacetin as antipyretics, in the acute stage.

The careful curetting of the uterus, after dilatation, with antiseptic drainage, if there be endometritis, in the chronic stages of the disease.

The internal administration of perchloride of mercury; the value of this treatment was pointed out in the first edition of this work.

The early evacuation of any serous fluid by the aspirator, avoiding pulsating vessels and taking careful antiseptic precautions.

Early evacuation of the pus by the branched uterine dilator. If this be

present in quantity, and there be multiple pus cavities, when the wound has been enlarged the finger may be introduced to break down the septa.

Apostoli's treatment by electrolysis (*vide* remarks on Gynæcological Electro-Therapeutics).

I must say a word of caution regarding the rectum. I could cite cases in which both serious consequences to the patient, and unfortunate errors of diagnosis, have resulted from overlooking concretions in the large intestine and rectum when there were perimetritic exudations also present. *I would warn all practitioners to explore the rectum and carefully palpate the colon in every case where a doubt exists as to the nature of an obscure abdominal swelling.*

*Vapo-cauterization of the Uterus.**

To Pincus of Dantzig is due the method of zestocausis, or the application of steam at 100° to 105° centigrade for one minute into the uterine cavity for pre-climacteric and climacteric hæmorrhage. It is right to say, however, that Pincus has pointed out the dangers of his method if it should be extended to such a length of time as one minute, half a minute being usually sufficient for the therapeutical effect of the steam. The uterus is thoroughly dilated in the first instance, the method adopted by Pincus being as follows: Every aseptic precaution is taken, and the uterine cavity is dilated. The steam is then conducted into it for the time mentioned, and after this application, which it is asserted is not very painful, strict aseptic precautions are adopted. Fatal results have followed from this treatment, as in the case reported by Van de Velde of Amsterdam.† The case occurred in Traub's klinik, and the steam was applied at 105° centigrade. Necrosis of the uterus followed, with resulting perforation of the fundus, which led to septic peritonitis. Van de Velde asserts that every care was taken in the application of the vapo-cauterization. The case in its course and terminations presented much the same symptoms as arise when there are fatal consequences from the electro-caustic method of Apostoli. Pincus, however, asserts that the effect of the treatment was due to the too high temperature of the steam and the too lengthy application of it.

Snégireff, at the Moscow Congress, in 1897, advocated this treatment for uterine hæmorrhage when there was no adnexal disease. In cases of malignant ulceration, the discharge is lessened and the putrid odour is controlled. So far, it does not appear that this treatment has any advocates in this country, and certainly, with all the other means at our disposal for treating hæmorrhage, whether pre-climacteric or other, it would appear inadvisable to resort to a plan which admittedly has serious elements of danger associated with its application, and which, without great caution and skilful hands, not to speak of certainty of diagnosis, may have disastrous results.

---

* See Fig. 302A, p. 397.

† *Central. für Gyn.*, 1898, No. 32.

PELVIC PHLEGMON.	PERIMETRITIS.	PELVIC HÆMORRHAGE.	FIBROUS TUMOURS.
Connected more frequently with abortion; parturition; operations on the uterus; septic causes.	Coming from similar causes; also often from imprudence during menstruation; from ovaritis and escape of fluid into the peritoneal cavity; gonorrhœa is a frequent cause.	Caused by some irregularity of menstruation; traumatic causes; atresic conditions of uterus, vagina, or vulva. Most frequent cause ectopic gestation.	The characteristic, slow, and more uniform growth, and the history of local pelvic distress.
Acute febrile symptoms—may be slight and unnoticed.	Acute febrile symptoms more severe; nausea, vomiting, tenderness, tympanites, more likely to be present.	Sudden appearance; usual signs of hæmorrhage; occurs without preceding symptoms of inflammation. Symptoms of peritonitis follow.	Febrile symptoms absent. History of menorrhagia and metrorrhagia.
Early hardness is more likely to be lateral.	Early hardness felt posteriorly or anteriorly.	Hardness may be felt in either cul-de-sac displacing the uterus, more generally in Douglas' space.	Distinctly uterine.
Swelling easily reached from the vagina; soft and doughy at first, then becoming hard; softening again if pus should form.	Swelling more frequently retro-uterine; if lateral, likely to be out of reach of the finger.	Swelling more frequently found in the posterior cul-de-sac or in Douglas' space. Soft at first, gradually hardening.	Swelling incorporated with the uterus, and moving with it; tumour hard from the first and round; characteristic feel of cervix.
Pain, varying in degree, present. Not so painful as perimetritis.	More painful, pain usually felt previous to swelling.	Pain follows the formation of the swelling.	Not sensitive; pain may be altogether absent.
Retraction of the thigh.	Retraction of both thighs.		
Uterus becomes less movable; is displaced laterally, or is fixed.	Uterus less movable; frequently fixed.	Uterus displaced according to the site of the hæmatocele.	Uterus at this stage generally movable.
Swelling not so diffused.	Swelling more diffused.	Quick diffusion of swelling.	

CHAPTER XIX.

PELVIC HÆMORRHAGE.

CAUSATION.—Pelvic hæmatocele was a term applied originally by McClintock to a collection of blood, which is either *enclosed* in the peritoneum behind the uterus, in Douglas' pouch—*retro-hæmatocele* (Nélaton); or in front of the uterus (comparatively rare); between it and the bladder — *ante-hæmatocele.* The blood may escape posteriorly or anteriorly into the cellular tissue, forming a thrombus or hæmatoma, by some styled *sub-peritoneal hæmatocele.* If it escaped into the peritoneum, it was called *intra-peritoneal.* It is certain that the term 'pelvic hæmatocele' has created considerable confusion in the minds both of students and practitioners. This has arisen in consequence of its wide application to any collection of intra-pelvic escape of blood, whether intra-peritoneal or otherwise. It is true that blood does escape from causes other than those directly associated with conception. Thus, the bleeding may occur as a consequence of pernicious anæmic states, purpura, malignant jaundice, and during the zymotic fevers. It may happen coincidently with suppression of menstruation from such causes as mental shock, exposure to cold, and coitus. It may be the direct result of such disease in the ovary or Fallopian tube as may lead to the rupture of either (see chapter on Diseases

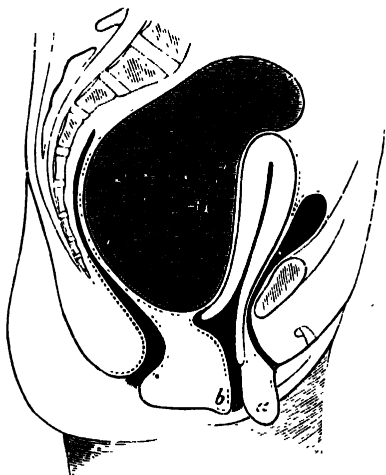


FIG. 299.—RETRO-HÆMATOCELE. (Schroeder.)

of the Fallopian Tubes). Traumatism is the cause of the bleeding after operations on the adnexa and uterus, or such direct violence as a blow, a kick, a fall, forcible dilatation of the uterus, and violent coitus. It may be associated with atresic conditions anywhere from the vulva to the Fallopian tubes. Virchow and Schroeder assign as a cause perimetritis and peri-uterine phlegmon, though these inflammatory conditions must be more frequently regarded rather as a consequence than as source of the hæmorrhage. When we come to investigate the origin of the hæmorrhage, we find in the great proportion of cases that it is directly due to causes immediately connected with conception and pregnancy. Of these latter, by far the larger number are the result of tubal fœtation. Next in frequency is abortion, and in some rare cases the loss has been brought about by rupture of the uterus in early pregnancy. I prefer the term 'pelvic hæmorrhage' to that of 'pelvic hæmatocele,' though we may retain the term pelvic hæmatoma to express the fact that the blood has escaped into the cellular tissue of the pelvis. We may, then, thus divide the causes of pelvic hæmorrhage into two principal groups—(*a*) that connected with pregnancy, by far the most numerous; and (*b*) miscellaneous.

Causes of Pelvic Hæmorrhage.

(*a*) *Connected with Pregnancy*:—

Ectopic gestation.
Abortion.
Molar pregnancy.
Rupture of uterus (*in early gestation*).

(*b*) *Miscellaneous*:—

Menstrual suppression from . .	Mental shock. Cold. Coitus.
Disease in the ovary or Fallopian tube	Leading to rupture of the blood sac in the ovary or Fallopian tube.
Traumatic . .	After operations. Blows, kicks, falls, some overstrain, the use of tents; excessive coitus.
Perimetritis and parametritis (*Virchow and Schroeder*)	

Abnormal blood-states.	Anæmia. Plethora. Purpura. Zymotic diseases. Jaundice.
Obstruction to the flow of blood, menstrual or other (as in atresia), in the . . .	Fallopian tubes. Uterus. Vagina. Vulva.

Pelvic hæmorrhage is more likely to occur during the active period of menstrual life; but I have known a case in which a considerable escape of blood occurred from a fall off a chair, in a patient over sixty. I have on one occasion seen a large pelvic effusion form suddenly in a severe case of typhus fever.

Symptoms and Physical Signs.—There may or may not have been some previous hæmorrhage, or a suspicion of it. The symptoms in

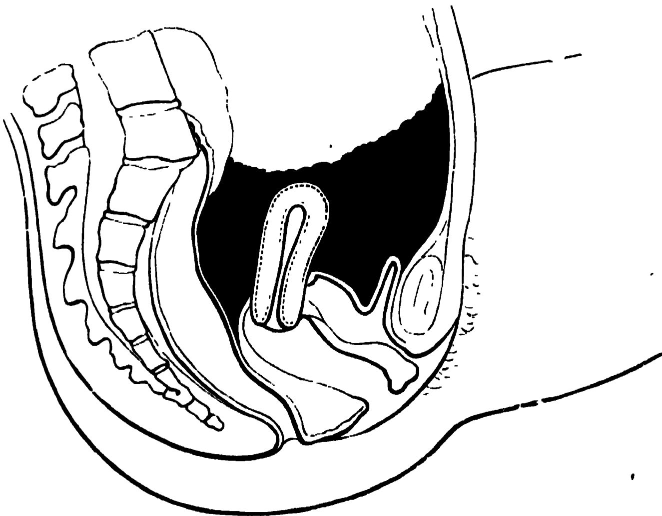


FIG. 300.—HÆMATOCELE IN THE PERITONEUM. (After Emmet.)

the relative order, and as they usually occur, are—shock, tendency to collapse, great pelvic pain, syncope, sense of weight and pressure in the pelvis, vomiting, fall in temperature, rapid and weak pulse. These symptoms may persist, and death may ensue, despite every

effort to rouse the patient. They are all intensified in the intra-peritoneal variety. Their severity will in great measure depend on the quantity of blood which is effused into the peritoneal cavity. When reaction sets in (within forty-eight hours), the patient may suffer from rigors; the temperature rises, the skin becomes hot, the pulse changes in character. Menorrhagia may increase or persist. On examination, the abdomen is frequently found tense; there is abdominal swelling, and dulness is detected, especially over the hypogastric and inguinal regions. The abdomen is tender on palpation. On vaginal examination, a mass is found generally



FIG. 301.—RETRO-UTERINE HÆMATOCELE (St. Thomas' Museum) FROM A DISEASED OVARY. It was bounded above by plastic effusions and the small intestine. (Robert Barnes.)

posterior to the uterus—rarely anterior; it is smooth, soft at first, and has a semi-fluctuating feeling. The uterus is pushed forwards against the bladder in retro-uterine hæmorrhage; backwards against the rectum when the blood escapes anteriorly. The bladder is generally encroached on, and retention of urine may result, or dysuria. The rectum is compressed. There is either difficulty in defæcation, or rectal irritation may be present with tenesmus and dysenteric symptoms. As the case proceeds, the uterus becomes more fixed, and the mass is harder. The further symptoms and

local signs depend on the course of the effusion, whether absorption occur or hardening of the mass. If suppuration follow, the pus finds an exit through the rectum or vagina. It may escape, though rarely, into the peritoneal cavity. On the other hand, it may slowly disappear without involving these viscera. Should suppuration take place, we have to dread the danger of peritonitis, septic absorption, and septicæmia.

As illustrative of the fact that cases in which a considerable escape of blood into the meso-metrium, the result of tubal pregnancy, may get well without interference, I may mention a case I saw with Dr. Threadgale, of Brondesbury, in which, in a presumable pregnancy of the second month, an effusion that reached to within a few inches of the umbilicus was reduced to a mere perimetric hardness. The local treatment consisted mainly in hot antiseptic vaginal douches, and Leiter's abdominal irrigator applied externally charged with iced water.

Several years since, I had a remarkable case under my observation on and off for nearly three years. I was telegraphed for from a distance to see a young married woman shortly after the hæmorrhage had suddenly set in. She had a typical conoidal cervix. She was then in acute pain. The bladder was pressed against by the uterus, which was pushed upwards and forwards, so that it was impossible to reach the cervix with the finger; there was retention of urine, and with the greatest difficulty the rectum was occasionally emptied by enema. She was dangerously ill from the protracted pain and distress, caused by the pressure on the pelvic nerves and viscera. This swelling gradually disappeared, and when I last saw her the bowel and bladder acted in quite a healthy manner, and the uterus had fairly regained its mobility, though not entirely. I cite this case merely to show how protracted such a recovery may be.

Necessarily the most important question is the relation of hæmatocele to extra-uterine pregnancy. Such questions as the death of the fœtus and the coexistence of a fœtal sac with the urgency of the symptoms, independently of the hæmatocele, must influence the decision to operate. If the ovum be dead, operation may not be urgent. The difficulty exists of being able to recognize a tubal abortion hæmatocele apart from other causes of tubal hæmorrhage. As Falk has pointed out, it is most difficult to differentiate rupture, complete abortion (the ovum being expelled into the abdominal cavity), and incomplete abortion, where it remains in the tube. Clinically, such a differentiation is often impossible, nor can we say when the blood is encapsuled. We may be assisted in our diagnosis, as Freund has shown, if there be undeveloped mammæ, very prominent clitoris, and other evidences of cessation of pregnancy. Examination under all circumstances must be carefully and not too

roughly conducted. Whether the treatment should be of an expectant character or not, must, as Veit has shown, depend upon the consideration of these circumstances, one thing being certain—that the mere presence of a hæmatocele does not in itself warrant interference.

Diagnosis of Pelvic Hæmorrhage.—This is not, in some old-standing cases, at all so simple a matter as at first sight it may seem. We have to differentiate a pelvic effusion from a retroverted uterus, a perimetric exudation, a uterine fibroid, a tumour or cystic formation in the pouch of Douglas, or in the broad ligament; an ectopic gestation. (See chapter on Ectopic Gestation.)

We must rely in diagnosis on these proofs:—

The history of the case—the suppression of menstruation, the previous evidence of conception having occurred, the occurrence of some accident or operation, the presence of a zymotic disease or pernicious anæmia, an atresic uterus or vagina.

The suddenness in the accession, and the severity, of the symptoms.

The occurrence of hæmorrhage.

The position of the tumour posterior to (as a rule), and not at the sides of the uterus.

The mode of formation of the tumour; its painful nature; its rapid development; its softness in the first instance, and the subsequent hardness, accompanied by shrinking of the tumour.

The position and size of the uterus, determined bimanually and by the uterine sound; the independent mobility of the uterus; the later appearance of pus, and the associated reduction in the size of the tumour.

Prognosis.—This must always be grave—much more so in the intra-peritoneal than the sub-peritoneal effusion. There is the danger of collapse, exhaustion from recurring hæmorrhage; the pain of pressure, septicæmia, and peritonitis.

Treatment.—Absolute rest; ice over the hypogastrium; ergot given internally, and, better still, by means of the subcutaneous injections of ergotine or ergole (gr. iii. to gr. v.) into the gluteal region; opium later on during the period of reaction, both by the mouth and by the rectum (enema and suppository); quinine with digitalis; stimulants, given by the rectum if necessary, to prevent syncope (iced champagne and brandy are perhaps the best). I have already entered into the question of evacuation of the fluid,

and, in order to avoid repetition, must refer the reader to the chapter in which this is discussed (*vide* pp. 161-163).

Once it has been determined that there is a strong probability of the rupture of a tubal pregnancy, all modern teaching is in the direction of immediate cœliotomy. The friends must at once be warned of this. Such a step will depend upon the nature of the immediate symptoms, and on the presence of such constitutional conditions as persistent or variable high temperature, rapidity of pulse, sickness, attended by local pain, and increase of swelling. (See chapter on Ectopic Gestation.)

This case of pelvic hæmorrhage I regard of sufficient clinical interest to record. It is typical of its kind, and is instructive.

A married woman aged thirty-eight years had had four pregnancies, and one miscarriage. The youngest child was aged fifteen months. The catamenia was regular after the birth of this child. The patient had menstruated during previous pregnancies for several months. During the last pregnancy the catamenia continued for nine months. A menstrual period commenced on April 5th, the regular time, but did not terminate as usual, and there was a constant show for two weeks, during which period she complained of violent pain in the left iliac region, with constant nausea and attacks of faintness, and with pain in defæcation. On May 6th she was admitted into Stanmore Cottage Hospital complaining of pain, especially over the left side. There was a swelling in the left inguinal and hypogastric regions, and still some hæmorrhagic discharge from the uterus, the bowels moving with difficulty. I saw her in consultation with Dr. Hamilton Allen on May 14th, and found the condition of things as mentioned. There was then considerable fulness in the left fornix. The os uteri was patulous, and there was sanious discharge from it. It was decided to dilate the uterus and explore the cavity. This was done with a negative result. At the same time the friends were told that an operation would in all probability be necessary. I saw her again on the 19th, and decided that if there were any change for the worse abdominal section should be performed. From the 20th to the 22nd pain and distension increased, and the temperature range, which previously had been nearly normal, varied from 100° to 102°. The bowels could not be moved by enema. On the 23rd she was operated upon. On opening the abdomen, a large sac, extending above the umbilicus, was discovered. To the anterior surface of this the bowel was adherent in parts, and also the omentum. It was firmly fixed posteriorly and quite impossible to separate. On tapping the sac, after careful protection of the bowel with sponges, it was found to contain semi-coagulated blood. The sac wall was, therefore, freely opened and the contents turned out. The edges were pared and the sac was stitched by interrupted fishing-gut sutures all round to the peritoneum, which was then brought together and sutured, leaving sufficient space for a drainage-tube. The abdomen was closed by three sets of sutures, and a drainage-tube left in. The temperature remained normal after the operation, and the tube was removed on June 1st. The patient

made an uninterrupted recovery. My first impression on seeing this case was that it was one of extra-uterine fœtation, the date of which could not be determined from the previous history. I thought also that there might have been pelvic hæmorrhage caused by the rupture of hæmato-salpinx, or possibly due to an early miscarriage. I certainly was astonished on seeing the size of the sac, the thickness of its walls, and the extent of the adhesions. The contents were afterwards carefully examined for the presence of a mole, but such could not be found. No tube or ovary could be detected on the left side. There had evidently been recurrences of hæmorrhage, and a recent bleeding within the few days prior to the operation explained the symptoms from which she suffered and the sudden increase in the size of the swelling.

Rupture of Ovarian and Tubal Cysts.—The possibility of such ruptures of ovarian and tubal cysts happening suddenly has to be remembered. I have myself on three occasions recently removed large-size blood-cysts from the parovarium and tube. The contents of such cysts cannot be diagnosed save by operation, or aspiration through the vagina, a step not devoid of risk.

In all other cases than those in which the hæmorrhage is the consequence of gestation, my experience of pelvic 'hæmatocele' would lead me to advise the surgeon not to interfere hastily with any collection of blood or coagulum unless there should be persistent evidence of the presence of fluid, or that symptoms supervene which are due to interference with the bowel and bladder from pressure, or point to the advent of septicæmia. The aspirating-needle may be used both for the purpose of exploration and also for the evacuation of pus. Should this not answer, and the fluid reaccumulate, an opening should be made with the guarded bistoury or thermo-cautery, and the cavity be subsequently washed out with some weak ($\frac{1}{10000}$) bi-chloride of mercury solution. It is a question if this be not the safest method of punction of a purulent intra-

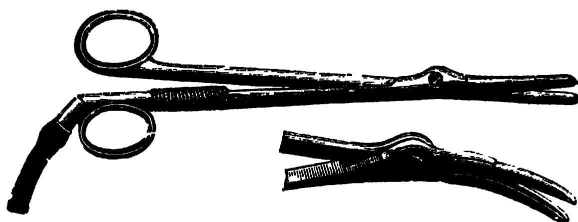


FIG. 302.—PAQUELIN'S CAUTERY SCISSORS.

peritoneal collection of pus, draining the cavity subsequently and tamponning the vagina loosely with sterilized iodoform gauze.

In extra-peritoneal hæmatocele, a branch steel dilator may be

employed to enlarge the vaginal opening and admit the finger and drainage-tube.

The use of Paquelin's thermo-cautery knife or scissors in opening the vagina was well illustrated in a case of John Phillips', brought before the Obstetrical Society of London; the clots were removed, and a Keith's drainage-tube was used. The value of sterilized iodoform gauze as a vaginal dressing in these cases cannot be too forcibly insisted on.

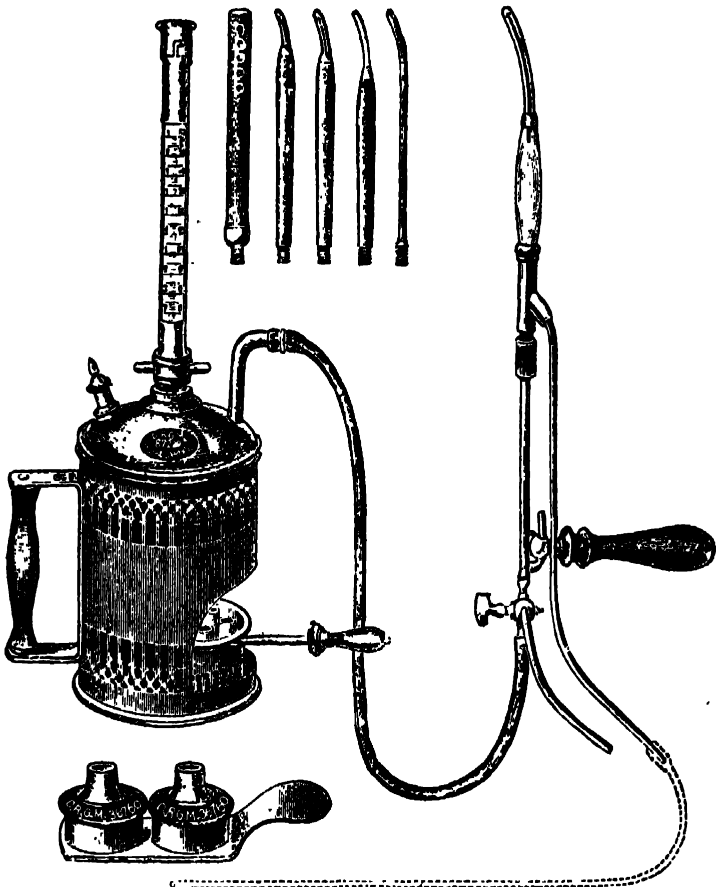


FIG. 302A. -VAPORIZER OF LUDWIG PINCUS.—*American Journal of Obstetrics*, Oct., 1899. (Abram Brothers.) (See Vapo-cauterization of the Uterus, p. 387.)

CHAPTER XX.

UTERINE NEOPLASMS—POLYPUS UTERI.

THOUGH uterine polypi should rightly be included in the description of uterine neoplasms, I devote a separate chapter to their consideration. A uterine polypus is a sufficiently characteristic growth to warrant a distinct study.

Polypi we may classify according to the elementary tissues from which they take their origin—cellular, glandular, fibrous, placental.

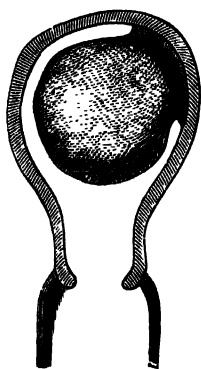


FIG. 303.—SUBMUCOUS FIBROID.

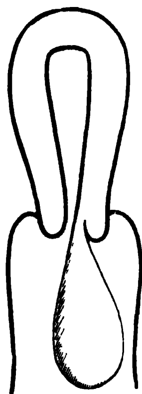


FIG. 304.—OUTLINE DIAGRAM OF POLYPUS OF CERVIX. (Adapted from Thomas.)

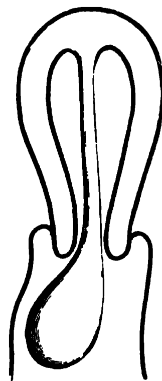


FIG. 305.—OUTLINE DIAGRAM OF POLYPUS WITH LONG PEDICLE ATTACHED TO THE SUMMIT OF THE UTERINE CAVITY; THE CERVICAL CANAL CONTRACTED ON PEDICLE. This may lead to partial inversion.

The first variety, springing from the cervix, consists principally of cellular tissue and mucous membrane; the second (also arising from the cervix) of hypertrophied follicles and connective tissue; the third of muscular and connective-tissue elements, the former

preponderating. Placental polypi have their origin in portions of placenta that have been left in utero, and which, becoming organized and incorporated with the uterus, form polypi.

Fibroid polypi spring from the body of the uterus, and are at one period of their growth submucous fibroids. They assume the form of polypi through extrusion into the uterine cavity, and by the gradual narrowing of the base of attachment into a pedicle.*



FIG. 306.—FIBROID TUMOUR OF THE UTERUS, SHOWING ENCAPSULATION IN THE UTERINE PARENCHYMA, AND THE ATTENDANT DEVELOPMENT OF CYSTIC POLYPI IN THE CERVIX. Two-thirds natural size. (St. Thomas's Hospital, Robert Barnes.) †

Diagnosis.—This will depend on the size and position of the polypus. Whenever obscure menorrhagia or metrorrhagia occurs or persists, especially if the discharge continue foul and offensive, there is but one safe rule, which is, to dilate and explore the uterus, and not to persevere with palliative treatment. The presence of a polypus can be then determined.

Dysmenorrhœa and Menorrhagia.—It must be remembered that a small polypus may be concealed in utero and cause severe dysmenorrhœa without the occurrence of menorrhagia or any perceptible uterine enlargement.

We may be further guided to the suspicion of polypus if there be some enlargement of the fundus, and the cervix be dilated.

Importance of Full Dilatation.—The first step towards the diagnosis and treatment of polypus is dilatation of the cervix. The facility with which we can feel the growth will depend on its size and position. At times this is comparatively easy; occasionally it is very difficult. A large extra-uterine polypus is felt at once

* See pp. 402, 412. † See chapter on Follicular Degeneration.

with the finger. The principal danger is that we may confound it with inversion of the uterus. We are not so likely to mistake it for prolapse.

Recently a curious case, showing how one may be mistaken if the uterus be not dilated, occurred to me :—

Retrocession of the Polypus.—A lady, in whom pregnancy was diagnosed, consulted me to verify the opinion. On examination, I was surprised to find a bleeding fibroid polypus protruding from the uterus. I advised its removal. She had severe hæmorrhage the next few days, and operation had to be unavoidably postponed. When placed under ether, which the patient insisted on having, to my surprise there was no polypus visible. I passed a uterine sound into the cavity, and as far as I could judge it moved freely in utero. I could discover no growth. I came to the conclusion that the polypus had become detached during the hæmorrhage of the preceding days. A week subsequently there was a return of bleeding and some watery discharge. On examination, I again saw the polypus appearing at the os uteri. I removed it on the following day, and found the pedicle attached above the internal cervix. It would appear that on the previous occasion, under the influence of ether, the growth had returned into the cavity of the uterus and so passed out of sight.

Intra-uterine Fibroid as an undetected Source of Dysmenorrhœa and Metrorrhagia.—In February, 1895, I exhibited an intra-uterine polypus at the Gynæcological Society, removed from a patient aged 32, recently married, in whom the loss of blood and aggravated dysmenorrhœa had brought about a most serious anæmic condition. Not long before I saw her, and previous to her marriage, the uterus had been dilated and curetted by a distinguished obstetrician. The submucous tumour was the size of a small pear. I discovered the intra-uterine growth when proceeding to divide the cervix (under an anæsthetic), as from the recent curettage I did not suspect its presence. The adnexa were healthy. Evidently the curette had passed round the growth, and the imperfect dilatation had not revealed it. The case was one showing the value of anæsthesia in diagnosis, and the importance of sufficient dilatation and exploration in dysmenorrhœa and metrorrhagia.

The following case needs no comment to show the necessity for great care in the diagnosis of intra-uterine growths :—

Salpingo-oöphorectomy performed for Dysmenorrhœa—Actual Cause discovered to be Polypus.

'Fancourt Barnes showed (at the British Gynæcological Society) the appendages removed from a patient, æt. 30, on whom he had operated on account of excessive metrorrhagia. The loss of blood had been so severe and reiterated that the patient was rendered extremely anæmic, pulseless, and almost moribund. Intra-uterine medication had afforded some relief for a time, but the hæmorrhage had returned and ignipuncture was tried with a like result. She was ultimately admitted to the Chelsea Hospital for Women,

where he removed the tubes and ovaries. The left ovary was cystic and adherent, but the right was free. For some months afterwards there was no bleeding, but again the hæmorrhage recurred, and two months ago she again took to her bed. Tait saw her, and concurred in the view that it would be well to curette the uterus. It was dilated for this purpose, with the result of revealing the presence of a small sessile fibroid growth, which was removed with the scissors.'

There is a complication which has to be kept in mind. A patient, a multipara, is suffering at the menopause from metrorrhagia. The uterus is enlarged, the cervix soft and follicular; there is some discharge from the canal. We dilate the uterus, and discover a small polypus—possibly two. These we remove. Still the metrorrhagia continues. Our patient is disappointed. There has been chronic hyperplasia, and some endometritis antecedent to and attendant upon the growth of the polypus. It is in these cases that curettage, or the application of nitric acid, should follow the removal of the polypus.

Clinical Evidences of the Presence of a Polypus.

We may thus tabulate the positive and negative signs of uterine polypus:—

Positive.—A tumour which has slowly increased in size, pyriform in shape, having a narrow neck or pedicle, insensible to touch, not painful when punctured, and varying in size.

Hæmorrhage is a constant accompaniment of polypus, and there may be a foul sanious discharge.

If the tumour be in utero, the sound passes into the uterus from two and a half inches upwards, the cavity of the uterus being enlarged to accommodate the growth; if in the vagina, we can trace the pedicle of the polypus to the cervix, and the uterine sound passes above this, inside the cervix, for over two and a half inches. The encircling ring of the cervix is traced below or around the pedicle, and the uterine sound can be passed inside the cervix, between the wall of the uterus and the tumour.

By careful conjoined examination the fundus can be felt in position, and has no marked depression. Thus the size and consistency of a polypus may be estimated: it may occur in nulliparous women and virgins.

Important Negative Signs.—Absence of os uteri; absence of sensitiveness, and commonly freedom from pain.

Symptomatology.—The principal symptoms are: Hæmorrhage,

uterine pain, vesical and rectal distress (dependent upon the size of the polypus and its position); dragging pain in the back, and perhaps difficulty in walking if the polypus be large; occasionally, dysmenorrhœa.

Treatment.—Before removing a large polypus it may be necessary to restore the patient's general health, shattered by the long-continued strain and loss of blood. This is done by preliminary rest, the use of astringents locally, and dilatation of the cervix by means of the larger bougies, tents, or Barnes' dilator.

Removal of Polypus.—We may remove a polypus by means of the écraseur, the galvanic cautery wire, the polyptome, or by hyste-

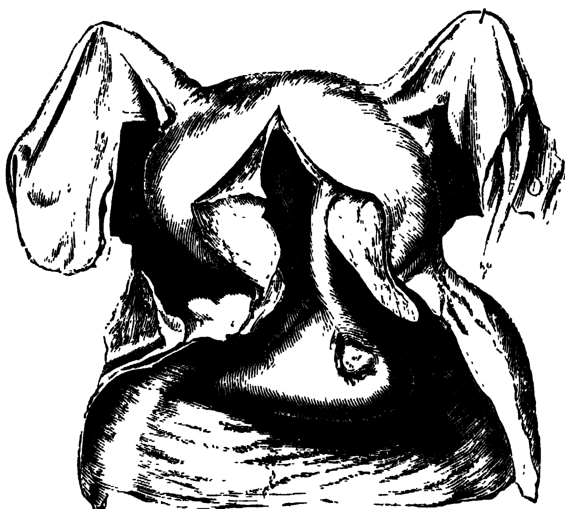


FIG. 307.—FIBROID POLYPUS WHICH HAS BEEN EXTRUDED FROM THE UTERINE CAVITY AND RETAINS ITS SHAPE. Half-size. (College of Surgeons, Robert Barnes.)

rotomy. Small polypi may be twisted. In examining a polypus on one occasion, the growth came away in my hand by simply twisting the very narrow pedicle. If the polypus be large, we may require for its removal an écraseur, vulsella, tenacula, and a polyptome.

To remove a polypus, if it be intra-uterine, the uterus should be thoroughly dilated. An anæsthetic is as a rule not necessary. The removal is not sufficiently painful or distressing to require it. In the instance of some large polypi in nulliparous women and virgins, it is well, for a few days previous to operating, to distend

the vagina with a Barnes' larger-sized hydrostatic bag. The woman is given a dose of bromide of potassium the night before the operation. She is placed in the lithotomy position on a suitable couch or table, and by means of the fingers or a notched director the wire is carried well up to the pedicle of the tumour; after which manœuvre, the écraseur having been pushed as far as the neck of the polypus, the wire is gradually tightened. It can be

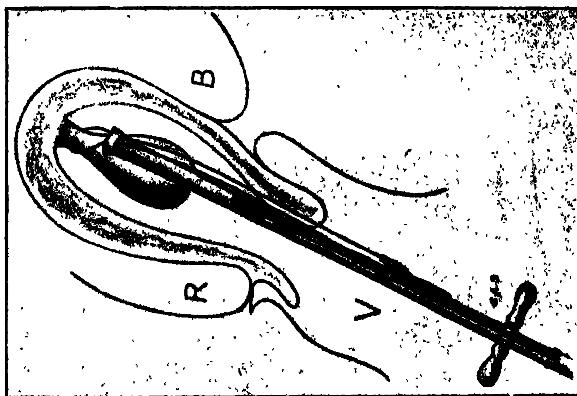


FIG. 308.—APPLICATION OF ÉCRASEUR TO POLYPUS.

now adjusted to the pedicle, as near as possible to the uterine wall, without injury to the latter. The tumour is then removed by *slowly* tightening the wire and resting at intervals in the usual manner.

Any complaint of pain is an indication of injury to the uterus.

When severed, and loose in the vagina, the tumour may be

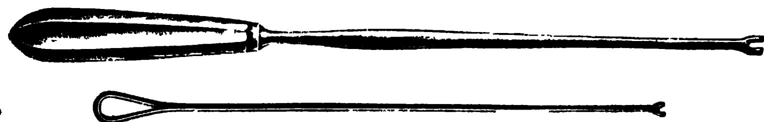


FIG. 309.—WIRE CONDUCTORS.

removed by an ovum forceps. If the polypus be very large, and cannot after its detachment be brought away, or if it endanger the perinæum and its vessels, it must be divided with a polyptome. Sir J. Y. Simpson devised a cutting-hook for this purpose (Simpson's polyptome). The perinæum has been incised at either side of the median line, in order to enlarge the outlet, so as to facilitate the removal of a large polypus.

Routh's Wire Conductors.—The wire conductors consist of two parts: first, an internal solid portion, fixed to a handle; and second, an internal hollow tube, which can be moved up or down on the first, but capable of being secured at any point by a pin inferiorly near the handle.

The distal extremities of each part are terminated by a concave end, the concavities facing each other, so that when brought together they constitute an aperture through which the wire may pass, and hang below the handles. Two of these directors together, and so connected, are used. Placed together side by side, they are pushed up to any desired point, armed with the wire, the ends of which should project outside the vagina. One director is now

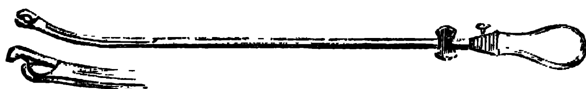


FIG. 310.—ROUTH'S WIRE CONDUCTOR.

held *in situ;* the second, carrying the wire along with it, is brought round the tumour to the other side of the first one. Both directors are now held together, and the free ends of the wire, hanging out of the vagina, can be passed through and fixed in the écraseur, which is brought up to the distal end of the wire directors.

The pins below the directors are loosened, the outer tube pulled down, and so both wire directors are liberated from the wire, and may be removed, and the écraseur can act. The directors are generally six in number, with varied curves to meet any irregular projections of the tumours.

AUTHOR'S POLYPTOME (Fig. 311).

Some years ago I removed a polypus from the uterus of a nullipara larger than an average size fœtal skull, and in which considerable difficulty was experienced in its extraction from the vagina. This I effected by lateral incisions of the perinæum. I then felt the want of some instrument (which would combine the purpose of forceps and cutting-knife) for the safe removal of these large growths without the necessity of incising the perinæum, or the risk of lacerating it. The application of the écraseur to divide the tumour into segments is tedious, and at times difficult. To meet such difficulties I devised an instrument consisting of a straight forceps, lightly made with slender blades, yet sufficiently strong to compress the tumour. A groove is cut in the lower fourth of these blades, and they are so shaped inside that the edge of a movable knife or saw glides easily along the blade. They lock readily on a revolving pivot, and the same lock carries a short sheath, through which the knife passes. The handle of the forceps is at right angles to the shank, and each half is connected by a rack and pinion-bar. A cutting blade accompanies the forceps, shaped somewhat like a dagger, so as to readily pierce any tumour, and cut from the centre outwards; a second is a fine saw. These are made of the finest tempered steel. The tumour can thus be grasped and cut through the centre. The blades are either turned round in the vagina, or the forceps may be applied

in a different direction, and the mass cut in four or more pieces. These segments may be separately withdrawn. A large and very hard fibroid it is impossible to divide across even with such an instrument. It is better to apply the forceps, and, if there be a risk of laceration of the perinæum

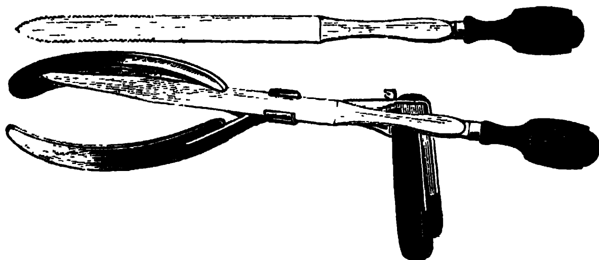


FIG. 311.—AUTHOR'S POLYPTOME.

during extraction, to make two short divergent cuts at each side of the fourchette so as to enlarge the vulvar orifice. After removal of the growth it is well to give a few doses of ergot, and occasionally to wash out the vagina with permanganate of potash or bichloride of mercury solution.

Adhesions of the Polypus to the Vagina.

I exhibited at the Gynæcological Society a large fibroid polypus removed by me. The polypus completely filled the vagina, and was quite as large as a fœtal skull. On passing my fingers into the vagina, the patient being under ether, I was surprised to find the tumour quite adherent to the vaginal wall. The breaking down of the adhesions was attended by the most profuse hæmorrhage, which ceased when the tumour was detached. I had considerable difficulty in getting the wire above the mass. In this case, by drawing the perinæum well back with the duck-bill and using a large vulsellum for delivery, the polypus was removed without injury to the perinæum.

Hysterotomy.—Clarence Webster * quotes a case of Veit's, in which, after dilatation of the cervix, he was unable to remove a polypus. In order to get more access to it, he cut through the attachment of the vagina to the anterior wall of the cervix by means of a transverse incision, and then separated the bladder almost as far up as the isthmus. He next divided the anterior wall of the uterus by a median incision as far up as this point, and was thereafter easily able to remove the polypus. The incision was again closed, and the vagina united to the cervix.

* *British Gynæcological Journal*, Feb., 1895.

CHAPTER XXI.

UTERINE NEOPLASMS (continued) FIBROMYOMATA.

ETIOLOGY, PATHOLOGY, SYMPTOMATOLOGY, ETC.

Etiology and Pathology.—Uterine fibroids occur frequently in women otherwise perfectly healthy. They often appear when no predisposing or exciting cause can be traced. The period of life has much to say to their occurrence. We may anticipate this relationship if we remember the active influence of ovulation and pregnancy on the uterine tissue. Thus uterine fibroids are found most often from the ages of thirty to fifty, and in married women. Still, they are frequently met with in the unmarried, and in women under thirty. There is the relationship also of cause and effect between uterine fibroids and sterility. Both are constantly associated with an old history of dysmenorrhœa. It will be found that in these cases, where the woman is sterile, the cervix is frequently malformed and conoidal in shape. It is curious that the African races, in which malignant disease is not a common affection, should be so liable to fibroid tumours.

Fibroid growths of the uterus have their origin in the muscular and connective tissues in the wall of the uterus, and more especially those of the body. The term 'fibrous' is not strictly accurate. The name 'fibro-myoma' expresses better the constitution of the tumour most frequently found. Some tumours present more the character of the muscular, others of the connective-tissue elements. The tumour is proportionally hard, according to its age and the development or preponderance of the fibrous tissue.

With regard to the vascularity of fibroids, save in the very large varieties, the arteries are not numerous. Yet the fact that the *bruit de souffle* is occasionally heard shows the size which may be attained by a vessel. The veins, especially those of the periphery, are large. A condition of venous intussusception, with fibromatous

fibres interlacing, has been termed by Virchow 'telangiectasis,' or cavernous myoma. Fibromatous polypi are not vascular, and the pedicle seldom contains vessels of any size; those which are present are remarkable for their retractile quality. Klebs has described what he considers to be lymphatic spaces between the bundles of fibres. Nerves have been traced into them by Bidder and Herts.

Alban Doran says: 'The muscle cells of a myoma are usually larger than those of the uterus in which it grows. Hence in a myoma removed during pregnancy they appear very large. Fig. 312 represents a section of a myomatous tumour of the uterus, removed at about the fourth month of pregnancy.

'By the term fibro-myoma,' he says, 'is implied a uterine tumour where groups of muscle-cells are blended with, or completely separated by, conspicuous tracts of true fibrous tissue. A small amount of young connective tissue as seen in the uterus is never absent from a pure myoma; in fibromyoma we see well-defined wavy bands of white fibre. Microscopically no two sections of fibro-myoma of the uterus look alike. Sometimes wide bands, purely made up of muscle-cells, predominate; sometimes the field is covered with white fibre, resembling that of which a fibroma of the ovary (Figs. 312–315) is entirely composed. Lastly, the muscle-cells, or at least structures resembling them in size and appearance, may be intimately connected with the fibrils which make up the fibrous bands. This latter condition is well indicated in Figs. 312, 313, which represent a section of a pedunculated subperitoneal "fibroid." Of all "fibroids," fibro-myoma is the commonest form. The presence of connective tissue in myoma, and also in fibro-myoma, probably accounts for the malignant degeneration of "fibroids," of which cases have been recorded.

'The important question, whether *myoma* of the uterus may degenerate into a sarcoma, must be answered in the affirmative (see chapter on Cancer). Virchow, Schroeder, and Martin (not to mention many others) believe that such a metamorphosis does occur. In fact, it is regarded by some as the rule in cases of sarcoma. David Finley recorded such a case before the Pathological Society of London, in which the tumour was encapsuled, as is the case in uterine myoma. This patient had noticed a hard swelling in the abdomen for fifteen years before the rapid increase occurred that called for interference.' *

Alban Doran, in a most interesting paper read before the Pathological Society (session 1890), discussed the entire question, and he then exhibited a tumour in which such transitional changes appeared to be occurring at the time of removal:

'The tumour was practically an expansion of the fundus, lying in its walls, which thus formed the capsule. Elsewhere the uterine walls were soft and very thick, entirely free from interstitial fibroids. Thus the tumour was solitary. A phlebolith, in appearance like an oval, semi-transparent, yellow pebble, one-eighth of an inch long, lay under the serous coat of the uterus

* *Trans. Path. Soc.*, vol. xxxiv., 1883, p. 177.

posteriorly. Pure fibrous tissue was practically absent. Uterine muscle-cells abounded. They formed thick bundles, and each cell was very elongated, and bore a long, narrow ("staff-shaped") nucleus. Groups of cells of a different type were also present. They were quite as distinct as the muscle-cells, but shorter and much thicker. The nuclei were distinctly oval and wide in the middle. The two varieties of cell above described are represented in the drawings.'

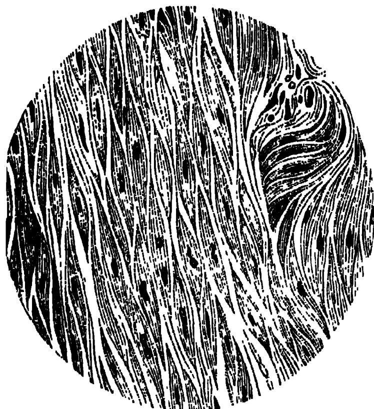


FIG. 312.—MYOMA OF A PREGNANT UTERUS, SHOWING EXTREME HYPERTROPHY OF THE MUSCLE-CELLS. (Alban Doran.)

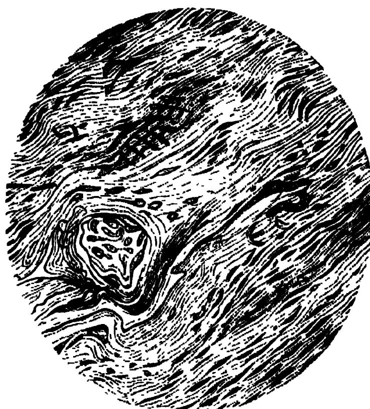


FIG. 313.—FIBROMYOMA OF THE UTERUS. In some parts of the field the muscle-cells and the fibrous tissue lie separate; in others they are closely blended. (Alban Doran.)

A uterine fibroid may pass into different forms of degeneration: (*a*) fatty; (*b*) colloid or myxomatous; (*c*) calcareous; (*d*) suppurative and gangrenous. The most important change from a practical

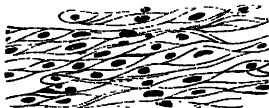


FIG. 314.—SECTION OF THE TUMOUR, SHOWING BUNDLES OF WELL-FORMED PLAIN MUSCLE-CELLS. (⅛" objective.)



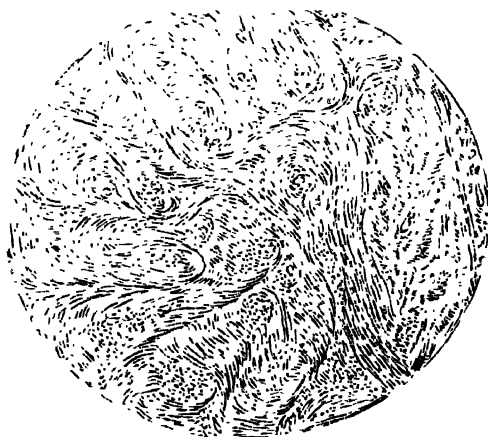
FIG. 315.—ANOTHER PART OF SAME SECTION, SHOWING SHORTER FUSIFORM CELLS WITH LARGE OVAL NUCLEI.

point of view, as it is very frequently met with and influences the diagnosis of fibroid disease, is the formation of cysts in the substance of the tumour. Cysts may form from (1) colloid or myxomatous

PLATE X.



SUBSEROUS FIBROID OF UTERUS WITH MUCOID DEGENERATION (Author.)



SECTION OF FIBROMYOMATOUS UTERUS. (Targett.)

[*To face p.* 408.

degeneration of the connective tissues; (2) hæmorrhagic effusion into the substance of the tumour; (3) œdema and effusion of serum, with separation of the fibres, and softening or liquefaction of the tissue, and the resulting formation of a cyst-like cavity; (4) fatty degeneration of the tumour. The transformation of a *fibroid* tumour into a carcinoma is extremely rare; the transition into a sarcoma of a malignant nature is not so uncommon.

Degeneration of Fibromata.

Of the various degenerative changes which the fibroid may undergo, Pozzi gives the following: (*a*) *Calcification*, which is comparatively rare, and in which there is a deposit of the lime salts, forming in some instances uterine concretions. A number of such cases have been described by Everitt.* (*b*) *Amyloid.*—This condition has been seen by Strass in a polypus. (*c*) *Colloid.* This is a myxomatous state. It has been described by Virchow as mucus effusion between the muscular fibrillæ, the mucine distinguishing it from simple œdema, as well as the proliferation of nuclei and round cells in the interstitial tissue. (*d*) *Ramollissement.*—This is a process of retrogression analogous to that which takes place in involution of the uterine tissues after labour. In this case the degeneration is of a fatty nature, but has not been verified microscopically, as noticed by Gusserow. To these we may add *Sarcomatous.* That such sarcomatous development does occur there is increasing evidence to prove. In treating of cancer uteri this is again referred to.

Fibromitis.

Under the name *fibromitis* Menière has drawn attention to an interstitial inflammation of fibroids, caused either by injury, exposure to cold, or occupation. There are the premonitory symptoms of inflammation—local pain and tenderness, general malaise, and constitutional disturbance. These are attended by rapid enlargement of the tumour. Symptoms of pelvic peritonitis may supervene. If suppuration should occur, the usual symptoms of a forming abscess attend on it. Such an abscess may involve the adjacent viscera. The course of this disease is tedious, though the prognosis is generally favourable. The affection must not be confounded with hæmatocele, pelvic peritonitis, or renal or hepatic colic. I attended recently a lady who suffered from all the symptoms typical of this 'fibromitis.' She passed through all the stages mentioned by him, and after the attack subsided, the uterus regained nearly, though not quite, its original size.

* *Amer. Jour. Obs.*, 1879, vol. xii.

Growth of Fibromyomata.

In a paper on the 'Biology of Fibromyoma of the Uterus,' Ludwig Kleinwächter * discusses the development of fibromyoma.

The more muscular the tumours are, the more rapid, according to Gusserow, is the growth, which is also dependent upon changes in the blood supply or inflammatory processes. Menstruation frequently decreases the size of the tumour. Constriction of the pedicle, by causing œdema, is followed by increase. Protracted illness may bring about a decrease of the tumour, but the general result of his investigations would tend to show that the rapidity of growth varies considerably in different cases. Schorler thinks that the first evidences of the commencement of the growth of the tumour are not observable before three months. Kleinwächter draws the following conclusions:

'No conditions in the growth of fibromyoma of the uterus are sufficiently strongly marked and regular to enable one to determine the age of a tumour from its size. In the generality of cases the growth seems to be rapid—only in exceptional instances slow. Occasionally the growth appears to advance by leaps and bounds. After the tumour has increased very slowly for a considerable time, it suddenly increases with extreme rapidity, and in a few months attains an excessive size, unless pregnancy should intervene. It is only in exceptional cases that a tumour comes to a standstill in growth, or decreases in the pre-climacteric years. It appears as though ergotine treatment aided this result in isolated instances, but the same thing might have occurred without the use of this remedy. Wasting diseases seem here to play a part.'

Influence of Pregnancy and the Menopause.

'During the progress of pregnancy existing tumours grow rapidly, or new ones appear and quickly increase in size. These phenomena are only to be observed in the case of the increased growth and life of the pregnant uterus. In puerperal involution these tumours decrease again, and eventually disappear, to all appearance, entirely. Sometimes the growth of large fibromata is preceded by the formation of small submucous or interstitial growths. A fibrous polypus may also be quickly followed by another one. Not infrequently several submucous fibromyomata are present, which may develope later on at various periods. The climacteric years have not nearly as great an influence on the shrinking of fibromyomata as has hitherto been supposed. Very often the tumours grow in spite of the menopause, and even more rapidly than before. It almost seems as though during this time the greatest danger of malignant degeneration of these tumours is to be feared.

'Doubtless, the original topographical position of the tumour or its covering is also a weighty factor in the case. Influencing circumstances should also

---

* *Zeitschrift f. Geburtshülfe und Gynäkologie Trans. Brit. Gyn. Jour.*, August, 1895.

be sought, as, for instance, whether newly-formed bloodvessels are taken into the tumour by way of the pseudo-membranes or not. In conclusion, inflammatory conditions of the periphery of the uterus, or inflammation of the deeper muscular tissues of the uterus, may both have an influence on the quicker or slower growth of the tumour.'

Varieties.—We may classify fibroid tumours of the uterus—(1) according to their pathological character; (2) their situations:

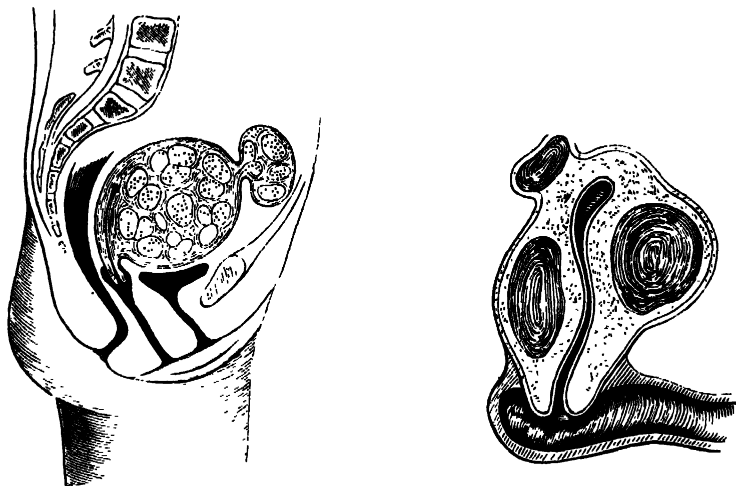
(1) Fibroma.
Fibro-myoma.
Myo-sarcoma.
Adeno-myoma.
Fibro-myxoma.
Angio-myoma.
Cystic myo-sarcoma.
Myxo-sarcoma.
Adeno-myxo-sarcoma.
Cystic fibro-myoma.
(2) Fibroid tumour of the cervix.
Fibroid tumour of the body.
(*a*) Subperitoneal; subserous.
(*b*) Submucous.
(*c*) Intra-mural; parenchymatous.

Pozzi divides fibrous tumours of the uterus under three heads. The first includes those which are not of large size, and which remain in the uterus; the second, those in which the growth tends towards the vagina; the third, those which develope in the direction of the abdominal cavity, and he tabulates the three types as follows:—

I. Metritic (small interstitial fibroma).

II. Type developing toward the vagina.	A. Fibromas of the intra-vaginal portion of the neck, sessile or pedunculated. B. Submucous fibromas of the body. C. Pedunculated fibromas of the body, or polypi, these latter being (1) intra-uterine or (2) intermittent in appearance, protruding from the uterus at the time of the catamenia and retreating in the intervals; and (3) intra-vaginal.
III. Type developing toward the abdominal cavity (subperitoneal or interstitial).	A. Pedunculated fibromas. B. Sessile fibromas, not including those in the broad ligaments. C. Sessile fibromas, included in the broad ligaments. } Abdominal. Pelvic.

Fibrous tumours are attached to the wall of the uterus either by a pedicle or by a broad base. The *subperitoneal* tumour pushes the peritoneum before it. It may become detached from the uterus, or



Figs. 316, 317.—Inters . and Subperitoneal Fibroids. (From Schroeder and Emmet.)

remain attached to it by a long pedicle composed of peritoneum and connective tissue. The *submucous* grows into the uterine cavity. If it be pedunculated, it is known as *fibrous polypus*. If parenchymatous, it may be *single* or *conglomerate*, encapsuled or non-encapsuled. The conglomerate may be formed by the fusion of a number of small fibroid masses, which give to the tumour a lobulated appearance. They may lie in a capsule of cellular tissue, or they may be simple outgrowths from the uterine wall, and continuous with and devoid of any capsular investment.



Fig. 318.—Interstitial Fibromata in the Fundus of the Uterus. (Pozzi.)

Diagnosis.—We distinguish a fibroid tumour of the body of the uterus by—

The history of the case.

Careful examination of the abdomen (see 'Examination of a Case' and 'Methods of Examination').

Digital and bimanual examination (rectal and vaginal).

The uterine sound.



FIG. 319.—A PEDUNCULATED SUBPERITONEAL FIBROID, WITH MULTIPLE NUCLEI. (Author.)

The diagnosis of some fibroid tumours of the uterus is not always so easy a matter as it may appear. When a student, I saw an excellent surgeon, after the preliminary incision for ovariotomy, fail in endeavouring to push a trocar into a solid fibroid of the uterus. Several experienced physicians and surgeons had concurred in the diagnosis. By that lesson (the woman died the same day) I was first taught the need for that extreme caution which in ambiguous cases we must exercise before we arrive at a conclusion, or pronounce an opinion in many cases of abdominal tumours. The old dictum, 'Verify, verify, and for a third time I say verify,' is not more truly applicable to anything than to the case of abdominal tumours. While exercising all the care and caution that he possibly can, the surgeon may fall into error in some cases. Spencer Wells said: 'In fact, it has happened to many

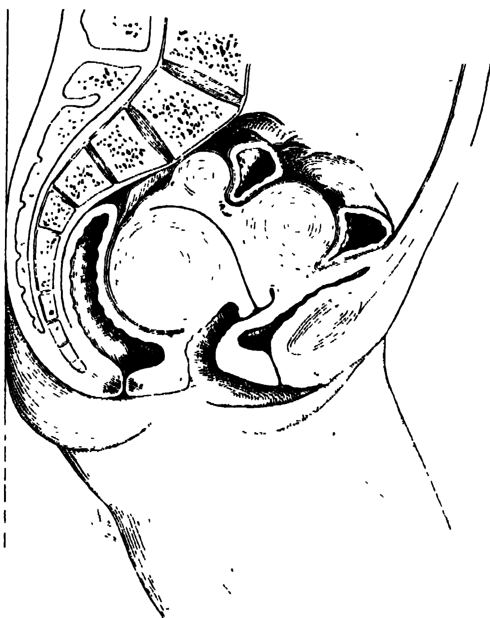


FIG. 320.—RETROVERSION OF A FIBROMATOUS UTERUS. (Doyen.)

surgeons, and to myself amongst the number, that we have commenced operations, as ovariotomy, and even removed tumours from the abdomen, under the impression that we were dealing with diseased ovaries, when, upon examination, they have proved to be pedunculate fibroid outgrowths from the uterus.' *

History of the Case.—These three negative points are of importance:—that the tumour has not appeared suddenly; that there have been no symptoms in the early history of the case of a febrile state;

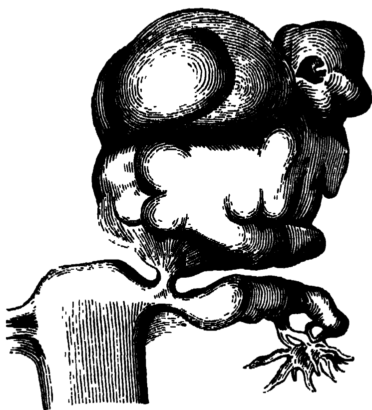


FIG. 321. — FIBROMYOMA, SPRINGING FROM THE LIGAMENT OF THE OVARY. (Doléris.)

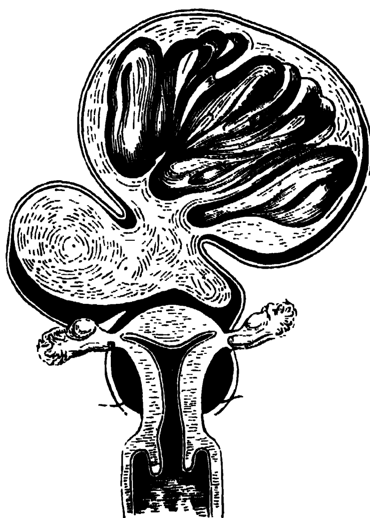


FIG. 322. — PEDUNCULATED FIBROMA OF UTERUS, WITH FIBRO-CYSTIC INTERIOR IN ONE DIVISION. (Schroeder.)

rarely is there any history of an injury. There has commonly been hæmorrhage, both menorrhagia and metrorrhagia. This latter symptom varies in degree. Occasionally the menstrual periods are

* At the meeting of the Gynæcological Society held on June 23, 1886, Lawson Tait exhibited 'a huge suppurating cyst, consisting of the dilated structure of the left kidney. The patient had been seen previously by Sir Spencer Wells, who had diagnosed fibroid tumour of the uterus, and by a distinguished London physician, who remarked that he did not think there was anything very much the matter. Dr. Milner Moore of Coventry was called in, and diagnosed a suppurating ovarian tumour. Tait saw the patient with Dr. Moore, and confirmed his view, with the extension that he believed the suppuration was due to strangulation and axial rotation. During operation all the opinions proved to be wrong, for the tumour turned out to be the left kidney.' The patient made an admirable recovery.

irregular, and the discharge scanty. There may have been pelvic distress, and some trouble of the bladder and rectum. These pelvic symptoms depend in great measure on the position of the tumour, its size, and the rapidity of its growth. This is generally slower than in ovarian cystoma. There is not the same rapid emaciation of the countenance which we see so commonly in ovarian disease. Many women who have comparatively large uterine fibroids do not exhibit any marked change in the expression of the face, nor is the fibroid affection accompanied by the same pallor of the countenance that marks the growth of the ovarian cyst. The presence or absence of pain will in great measure depend on the position of the tumour, whether it be pedunculated, and the direction in which it grows. Periodical attacks of peritonitis, or interference with the functions of the bladder or rectum, or inflammatory changes in the tumour itself, will give rise to pain. We often see large uterine fibroids the growth of which has not been attended by pain.

Differential Signs (Positive) of Fibromyomatous Tumour.

Enlargement of the lower portion of abdomen.

Enlargement of the superficial abdominal veins.

Sensation imparted on palpation—rather of a solid, symmetrical, and fixed tumour.

Tumour usually central; the increase in abdominal measurement is most marked from the pubes to the umbilicus.

The uterine enlargement, even early in the disease, may be defined by palpation and percussion over the pubes. This is best effected by pressing the ulnar border of the hand deeply a little above the pubes, thus making tense the abdominal wall, and pushing upwards the viscera. Vascular murmurs are frequently heard synchronous with the pulse.

By vaginal and bimanual examination, the uterus is found enlarged, either in its anterior or posterior wall. The extreme hardness may be at once apparent to the finger, or we may find two or three nodular enlargements; or the entire uterus may feel like a hard, immovable mass, fixed in the pelvis.

The os uteri is generally healthy, at times depressed; but more frequently, in advanced fibroid tumour, it has receded, and may not be reached by the examining finger.

There is occasionally a characteristic hardness of the cervix, which may be felt, like the nipple of the breast, moving over

a stony hard surface. This mobility of the conical cervix, independent of the enlarged body, is very marked in many cases of fibroid tumour.

The rectal and recto-vaginal examinations discover the enlarged, fixed, and hardened uterus.

Negative Signs.

There is not (generally) any fulness or prominence of the umbilicus.

There is rarely (save in fibro-cystic disease) any fluctuation. If present, it is very different from the superficial wave seen in ovarian disease.

(When there is a hard pelvic tumour, and at the same time evidence of the presence of fluid, we suspect the fluid to be ascitic.)

There are no uterine contractions.

The characteristic signs of pregnancy are absent.

Jones* has drawn attention to a condition of the pregnant uterus which may be mistaken for a fibroid tumour, in which the characteristic feel of the former is absent, as also the pear-shape of pregnancy, there being a false sensation of the presence of a pedicle. He attributed it to an absence of the amniotic fluid. Pozzi ascribes it rather to a pre-existing condition of hypertrophy or elongation of the neck of the uterus.

The Uterine Sound.—We thus see that in a considerable proportion of cases we may feel satisfied of the nature of the tumour without the use of the uterine sound. But this mode of examination is absolutely necessary to confirm the diagnosis in some cases. By it we learn (utero-abdominal, utero-vaginal, and utero-rectal methods)—

(*a*) The degree to which the uterus is enlarged;

(*b*) That the tumour felt through the abdominal wall *is* an enlarged uterus;

(*c*) That the tumour is fixed or movable;

(*d*) To differentiate fibroid tumours from other pelvic enlargements or flexions of the uterus.

Dilatation by Tents and Exploration.—In some cases, when still in doubt, we may have to dilate the uterus and explore the cavity with the finger. This might be required in such a case as that described by Schroeder, where the history pointed to a blighted

* *Edinburgh Medical Journal*, March, 1888.

ovum. On dilatation the tumour was discovered to be a hard fibroid. The same step may be needed in chronic hyperplasia. The necessity for dilatation in the diagnosis of fibroid of the fundus or submucous pedunculated tumours has to be urged. Without dilatation and exploration with the finger, it is often impossible to discover such growths.

Symptoms.—Uterine fibroid frequently exists, and yet there are no symptoms to attract attention during life. The presence of the tumour is only discovered in a post-mortem examination. The most important symptom is that of menorrhagia. This comes on gradually, at first as an increase of the menstrual period; after a

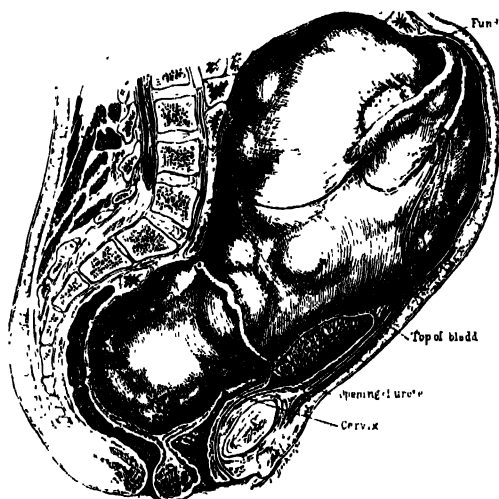


FIG. 323.—LARGE UTERINE FIBROID WITH EXTENSIVE SUBPERITONEAL RELATIONS. Adnexa at the summit of the fundus. It fills the pelvis and abdominal cavity. (Howard Kelly.)

time, this may amount to a flooding, or there may be irregular hæmorrhages. The loss of blood may threaten the life of the patient. Death has followed from rupture of a uterine sinus. Large vessels do not generally enter a uterine fibroid, or at least only such as have no capsule, and which have an intimate connection with the uterine tissue. The blood is poured out by the congested mucous membrane of the uterus, and not by that covering the fibroid. Cervical fibroids do not, as a rule, cause hæmorrhage.

Pain.—This assumes, in some instances, the form of dysmenorrhœa, especially in the case of the cervical fibroid. Pain also occurs from

the weight and distension, and the pressure of the tumour on the viscera and nerves of the pelvis. It is frequently of a 'bearing-down' nature.

Pelvic Symptoms.—Pressure on the bladder, rectum, and ureters produces frequent and painful micturition, constipation, and pain in defæcation. It may lead to hydro-nephrosis, or albuminuria, with uræmic symptoms. The consequences that may arise from compression of the ureters have to be kept in mind in cases of growing or large fibromata, and will naturally suggest that the urine in these cases should be from time to time examined, not alone for the presence of albumen or hyaline casts, but also for an increase in the quantity of urea.

Sterility.—This is a common consequence of uterine fibroid. Fibroid tumours may induce abortion, seriously complicate labour, and cause post-partum hæmorrhage.

Some Terminations of Fibromyomata.

1. *Arrest of Development.*—It may thus interfere but little with the health or comfort of the individual.

2. *Spontaneous Absorption.*—This is extremely rare.

3. *Spontaneous Enucleation.*—The tumour is protruded through the lacerated or sloughing mucous membrane. It is thus uncovered, and is forced onwards into the vagina by the uterine contraction.

4. *The tumour becomes pedunculated*, and is extruded into the vagina in the form of a polypus; or, if subperitoneal, becomes adherent, and remains either attached to some organ or lies loose in the peritoneal cavity.

5. *Suppuration and Gangrene.*—This may lead to perforation of the other viscera, peritonitis, and septicæmia. The fibromyoma may thus be disintegrated and discharged in fragments.

6. The various forms of degeneration already enumerated.

7. *Adhesions.*—Adhesions form between the tumour and any of the neighbouring viscera, more particularly the omentum, intestine, bladder, and rectum. Such cohesions cause hepatic, renal, and pelvic complications.

8. *Inversion of the Uterus.*—It is well to recollect that those fibroid tumours having a broad base, and which are connected with the parenchyma of the fundus, may cause, in their growth and extrusion, partial inversion of the uterus.

9. The various secondary changes and degenerations allied to adenoma, myxoma, sarcoma, telangisetasis.

Fibro-cystic Tumours.

Differentiation.

I hardly know any affection in the diagnosis of which the practitioner is more likely to fall into error, than in that of a large fibro-cyst of the uterus. I can recall to mind a few cases myself, in which, notwithstanding repeated and most exhaustive examinations, I have been mistaken. Still, this liability to err, with our improved knowledge, is becoming less each day. If the practitioner be resolved to take nothing for granted in the examination of a patient, and pass step by step by a process of exclusion to his final judgment, he will not be likely to make any mistake. Let us suppose that he has to distinguish in a given case *between ovarian tumour, pregnancy, and a fibro-cyst* of the uterus. He must, when he comes to decide the question of fibro-cyst, side by side with the other two conditions, place especial value on these points :

1. The length of time the tumour has taken to grow, and its mode of growth.
2. In palpation, the irregularity or dense feel of the tumour in parts.
3. The obscure character of the fluctuation as compared with ovarian dropsy.
4. The exclusion of the signs and symptoms of pregnancy.
5. The depth to which the uterine sound passes.
6. The mobility of the tumour with the uterus, both with the uterine sound and bimanually.
7. A careful examination by the rectum and vagina of the tumour *under an anæsthetic*, in the bimanual method.
8. Aspiration and examination of the fluid.
    (*a*) Its property of coagulating, spontaneously and by heat.
    (*b*) The presence of Atlee's fibre-cell.
9. By an exploratory incision: the colour of the uterine wall (dark red) is characteristic and quite distinct from the appearance of the cyst wall of the ovarian cystoma.

(See chapter on Diagnosis of Ovarian Tumours.)

Pregnancy complicating Fibromyoma.

Differentiation and Diagnosis.

The possibility of pregnancy and fibroma of the uterus coexisting must not be forgotten in making a diagnosis, especially in those

cases in which we are assured of a rapid growth of the tumour. We must not be misled by the fact that the catamenia have appeared. We may be confronted with a case in which the existence of pregnancy is not suspected, the presence of a tumour alone being recognized; or one in which the woman has been ignorant of the presence of a tumour, and attributes her symptoms to pregnancy. Or, again, we may be called to a case in which, though cognizant of the presence of a tumour, she fancies (through the cessation of the menstrual act) that she has become pregnant.

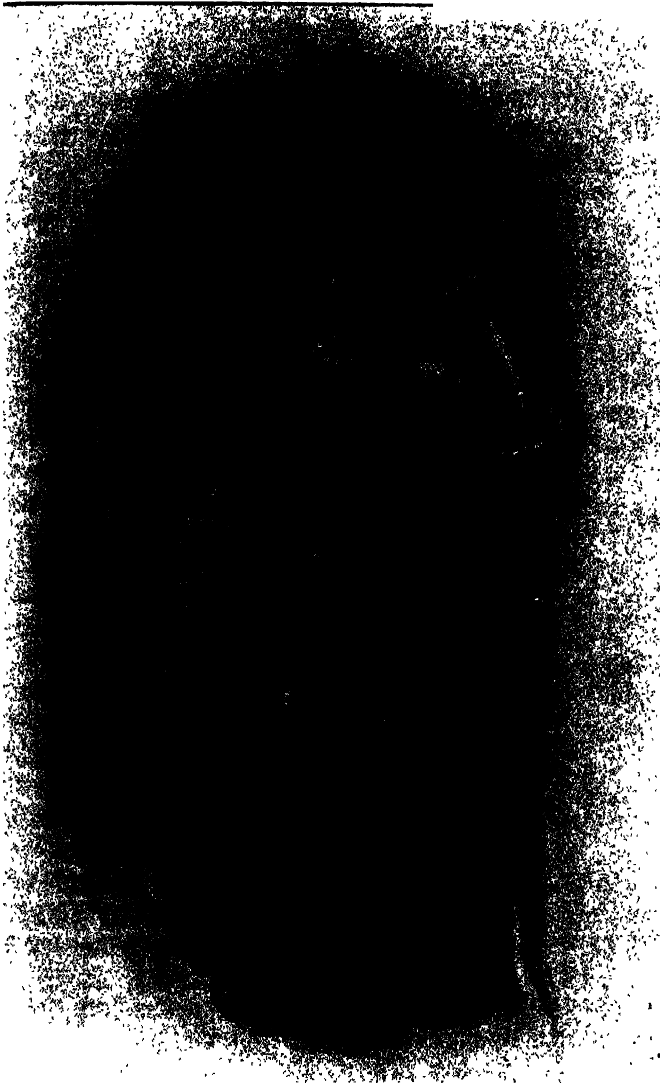
It has to be remembered that serious errors of diagnosis have been made with regard to fibroma and pregnancy. *The uterine pains* due to the tumour, when there has been effacement of the cervix, have been mistaken for those of labour, as pointed out by Peuch.*

The prominences occasioned by the fœtal members disappear when the uterus contracts, while those of fibromata are made more manifest. The same author quotes instances in which fibroma has been mistaken for ovarian cystoma at the time of labour, and *vice versâ.* Such authorities as Tarnier, Paul Dubois, and Danyau have fallen into this error. *Irregular hæmorrhagic discharges* may persist during pregnancy in cases of fibrous tumour. It may be necessary, in order to clear the diagnosis, to use a fine aspirating-needle in the interval between the pains. Fibroma of the cervix has been mistaken for *malignant disease.* Here attention to the distinctive features of carcinoma should prevent error. *Tumours growing from the pelvic walls,* such as fibromata, ostreomata, and enchondromata, may be mistaken for uterine fibromata. Careful exploration to determine the independence of the uterus, under an anæsthetic, will prevent this. *Fæcal tumours* have also (Braxton Hicks) been confounded with fibroma. As to *placenta prævia,* careful exploration will lead to a recognition of the characteristic feel of the placenta, though of course a fibroma may complicate the presentation, and this must be remembered in the examination. This fact is important, that hæmorrhage is more likely to occur during the latter months of pregnancy from the placental complication, while it may take place at any time during the nine months, and, may last all through, with irregular pains, in the case of the uterine tumour. The management of a case in which fibro-myoma of the uterus complicates pregnancy will entirely depend upon the features of the individual case.

For the abstract of the original paper, by P. Peuch, Montpellier, with complete bibliography, see *Brit. Gyn. Jour.*, parts 44, 46, 1896, and in the latter journal a series of interesting cases of pregnancy complicated by fibromyomata, by Haultain, of Edinburgh.

The existence of a fibroma-myoma may only be accidentally discovered when an examination is made to decide the question of pregnancy, when the

* *Archives de Gynæcol.*, vol. xxii., November 11, 1895; and *Gaz. des Hopitaux*, August, 1895.



PREGNANT UTERUS AND FŒ MOV]
PAN-HYSTERECTOMY. (G. E]

hardness of the mass and the irregularity of the surface of the abdomen will arouse suspicion.

In a case I saw with J. Hill Gibson, the patient had passed two menstrual

periods. She had had abdominal pain, tenderness, and sickness. The symptoms described as those of *fibromitis* were present. On examination it was discovered that she had a large and irregular fibroma. The decision on the question of superadded pregnancy was rightly deferred. Time proved that she was not pregnant.

In the case of Elder,* on the left broad ligament there was a series of small pedunculated myomata, in all about the size of a fœtal head at term. In the uterine wall was another flattened myomatous mass, and other nodules existed both in the fundus and cervix. The growth, which had caused intestinal obstruction, was successfully removed by supra-vaginal extra-peritoneal hysterectomy, an important feature of the case being that the patient had never suspected any uterine trouble until she became pregnant.

The drawing (Fig. 325), for which I was indebted to the late Dr. Byrne of Dublin, is one of an interesting case, the particulars of which are recorded by McClintock ('Diseases of Women,' pp. 116, 117).

It represents a uterus affected with interstitial fibromata, which was taken shortly after death from a woman in the Rotunda Hospital, Dublin, and which

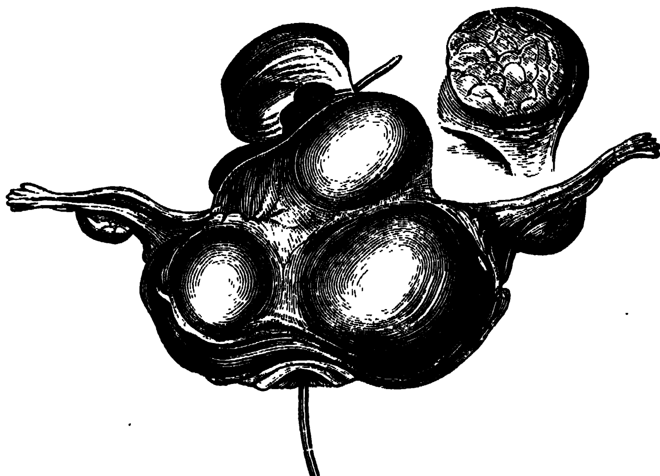


FIG. 325.—INTERSTITIAL FIBROMATA OCCURRING IN A UTERUS IN WHICH TRIPLE CONCEPTION OCCURRED, DELIVERY BEING EFFECTED AT THE NINTH MONTH. Three large myomata occupy the entire uterus; a fourth grows from the fundus, to which three smaller ones are attached—one of these is becoming pediculated and subperitoneal. There was no rupture.

is in its museum. There was a triple conception, gestation being prolonged to the ninth month. On September 22, 1858, the mother was delivered of

* *Brit. Gyn. Jour.*, May, 1896.

a dead female child. She was brought to the Rotunda, where a second child was born alive, the third child being extracted. She died in three hours of collapse.

I was sent a case some time since as one of tubal pregnancy, the projecting tumour in the left iliac fossa being mistaken for the extra-fœtation. The child was *in utero*, though at the period of pregnancy—the commencement of the fourth month—it was very difficult to pronounce positively, more especially as the woman was uncertain of the time of conception from irregularity of the menses.

The entire question of the practicability of operation during pregnancy, either for ovarian or fibroid tumour, has undergone a remarkable change in recent years, and both ovarian and parovarian cysts, uterine myomata and various diseased states of the adnexa, have been operated upon during this complication. Dealing here with fibromyoma, the following broad principles may guide us in deciding whether or not to interfere. We do not meddle with a pregnancy proceeding safely in the presence of a tumour which can be disposed of as the pregnancy advances, such as a pedunculated fibromyoma, a small subperitoneal cervical growth, or intra-ligamentary growths. We do not interfere with comparatively small tumours, especially if of the intra-mural kind. Only when serious complications arise during the pregnancy which threaten the life of both mother and child, or when the tumour is so situated that its removal offers the best chance of saving both lives, while non-interference risks both, should operation be attempted. Where such a probable gain cannot be hoped for, the best course is to wait for labour and perform Cæsarian section.

Treatment of Uterine Tumours.

The Palliative and Expectant Method consists in the use of means calculated—

1. To reduce hyperæmia and congestion.
2. To control and prevent hæmorrhage.
3. To promote absorption of the tumour.
4. To subdue pain and relieve rectal and vesical distress, and reduce hyperæmia and congestion.

To reduce Hyperæmia and Congestion.—Internally, for this object we give such medicines as ergot (liquid extract); hydrastis; stypticine; digitalis; iodide of potassium; bromides of sodium and potassium.

Bedford Brown reports favourably of the prolonged use of Syrup of Lactophosphate of Lime and Syrup of the Hypophosphites, given in ʒii. doses three times in the day. I have frequently given Fellows' Syrup in anæmia from recurrent hæmorrhage in fibroids, and find the combination with Dusart's Lactophosphate of Lime Syrup an admirable restorative and tonic.

Hydrastis Canadensis.—My success with hydrastis in fibroids has been uncertain. I have given it in a number of cases, both as tincture, fluid, and extract. A useful mixture for checking hæmorrhage is:

℞. Acid sclerotic, gr. iv.
Tinct. digitalis, min. lxxx.
Tinct. hydrastis Can. ʒss.
Tinct. matico, ℥ss.
Elix. saccharin, min. xxx.
Inf. matico ad ℥viii.

One-eighth part every third or fourth hour.

The liquid extract of ergot (℥ss.) may be substituted for the sclerotic acid, and tincture of strophanthus for the tincture of digitalis, or the strophanthus may be given in combination with the latter.

I have previously (p. 222) entered fully into the therapeutical uses of hydrastis, its alkaloid hydrastia, and stypticine. Both the palatinoids of sclerotic acid and stypticine, with those of strophanthus, are of use in cases of bleeding fibroid.

Locally, we may apply the hot vaginal douche ; scarify the cervix ; use astringent tampons of tannic acid and glycerine ; support the uterus with a Hodge's pessary ; dilate the cervix ; advise proper bathing (baths of iodine and bromine may be tried), and the use of such spas or waters as Kissingen, Kreuznach, Woodhall Spa.

Sexual intercourse must be moderated, and especially it should be avoided about the menstrual periods.

To control Hæmorrhage.—The subcutaneous injection of ergotine, as recommended by Hildebrandt, is occasionally efficacious in controlling hæmorrhage. I have injected as much as 15 grains of Bongean's ergotine, mixed with water and glycerine, into the gluteal region ; but the average dose is 3 to 5 grains. The needle must be passed deeply into the muscle, otherwise we are apt to cause an abscess. Still, much cannot be hoped for any result further than the control of the hæmorrhage. The action on the structure of the tumour, or in promoting spontaneous expulsion of intra-uterine fibromata, has been unsatisfactory even after some hundreds of injections. Sclerotic acid may also be used subcutaneously (gr. ½ to gr. i.). The solution of ergotine should be made fresh. Astringents may be given internally. The douche of hot water, 115° to 120°, should be used for ten to fifteen minutes three times in the day.

Dilatation of the Cervical Canal with sponge or laminaria tents will be found a valuable means of temporarily treating hæmorrhage.

Incision of the Cervix, in the case of a cervical fibroid, and where there is dysmenorrhœa, is to be preferred.

To promote Absorption of the Tumour.—Ergot, ergole, or ergotine, in the manner recommended, especially if the tumour be submucous or interstitial, and not very hard, may be tried; also perchloride of mercury, iodide of potassium, and iodine baths.

Electrolysis was first advised by Cutter. He passed the current through the tumour by two strong steel electrodes, inserted at either side of the abdomen, and reported an arrest in the growth in thirty-two out of fifty cases treated in this manner.

The name of Apostoli, of Paris, has now become prominently associated with the *électro-caustic* treatment of uterine fibromata.*

To relieve Pain and Rectal or Vesical Distress.—This must be subdued by bromides and sedatives. The tumour, if large and pressing on the pelvic viscera, should be pushed up out of the true pelvis. If it be subperitoneal, great relief may follow this step. Special attention must be paid to the bladder and rectum. Any accumulation in the latter should be prevented. The occasional use of an enema will be indicated.

* In previous editions of this work I devoted considerable space to the details of the galvano-caustic method of Apostoli. It is not a mode of treatment that experience has taught me can be relied on, and it has many elements of danger. I refer to it briefly further on, in dealing with the subject of Electro-therapeutics.

CHAPTER XXII.

SURGICAL TREATMENT OF UTERINE FIBROMYOMATA.

It would serve no useful purpose in this work to enter into a historical *résumé* of the development of hysterectomy, from the time when Charles Clay in England (1844) performed his first operation, to the latest technique of the modern procedure, as now generally adopted. Nor, on the other hand, do I propose, as in previous editions, to discuss operative procedures which have become practically obsolete, not only in this country and America, but in all the principal *frauen kliniks* and hospitals of Europe. I do not, therefore, occupy time in describing the extra-peritoneal treatment of the pedicle known as Hégar's method, or extra-peritoneal-celio-hysterectomy. The temporary elastic ligature, the rope ligature of Tait, the clamping of the pedicle, the permanent elastic ligature, and the various plans for fixing and treating the pedicle, are interesting from the historical point of view, but have become obsolete as modern surgical methods. The same may be said of Schroeder's intra-peritoneal method, intra-peritoneal-celio-hysterectomy, in which, after temporary application of the elastic ligature, the pedicle was fashioned by deep and continuous sutures, and the actual cautery or carbolic acid (Olshausen) applied to the uterine cavity, if this were opened. The same remark applies to the mixed method introduced by Wolfler, Hacker, and Sänger, in which the covered pedicle was attached to the abdominal wound, the latter surgeon suturing the parietal peritoneum to the posterior surface of the pedicle, which he covered with the visceral peritoneum, while the abdominal wound was closed with or without drainage.*

The modern procedures I here describe are those which are now generally adopted by gynæcologists, that I myself follow, and that I have had the privilege of seeing several times practised by such distinguished surgeons as A. Martin, Olshausen, Winter, the Landaus, Schauta, Doyen, Hartmann, and others, in the cliniques

* *British Gynæcological Journal*, May, 1897, part 49.

of Berlin, Vienna, and Paris. They are those also which have come into general practice throughout America, and are almost universally adopted by British gynæcologists.

I may thus summarize these methods :—

Celio-Vaginal Pan-Hysterectomy.—The operation originally performed by Bardenhauer and Baer on the Continent, and Mary Dixon Jones in America.

Hystero-Myomectomy—Supra-Vaginal Hysterectomy.—As performed by Howard Kelly.

Pan-Hysterectomy (Celio-Vaginal-Salpingo-Oöphoro-Hysterectomy).—Doyen's methods by ligature, lever pressure forceps, or clamp.

Pan-Hysterectomy by Electro-Hæmostasis.—Skene and Jacobs.

Vaginal Pan Hysterectomy.—Vaginal pan-hysterectomy by ligature; Doyen's clamp forceps; Landaus' clamp and morcellation; Doyen's pressure forceps and craseur with ligature; Jacobs' electro-hæmostasis.

Myomectomy.—Enucleation of the tumour, conserving the uterus.

Morcellement.—As performed by Landau, Schauta, Pozzi, and Doyen. Division of the cervix and uterine wall over the tumour, which is incised and removed piece by piece by means of forceps, scissors, scalpel, or *tube tranchant* (Doyen).

Enucleation.—As performed by Martin, Spiegelburg, Alexander, and others.

Decortication.—Alone or completed by supra-vaginal hysterectomy. Specially applicable to tumours springing from the broad ligaments and adnexa. Peeling off of the peritoneal covering, resection of the tumour, closure of its bed by sutures; drainage either by the vagina or the abdominal wound, according to circumstances, such as the size of the tumour and its attachment or proximity to the uterus.

Salpingo-Oöphorectomy.—Removal of the uterine adnexa with intra-peritoneal ligature. This operation is indicated when there is serious and recurrent hæmorrhage from certain interstitial or intraligamentary tumours of comparatively small size, where we do not feel justified in advising hysterectomy.

MORTALITY AND RISK OF OPERATION.

It would serve but little useful purpose to enter into the various disputations and statistical records of different operators, whether American, Continental, or British, and the comparative advantages

of this or that method of removing uterine fibromata. Results arrived at by the most eminent surgeons, by what they assert to be the same method of operation, prevent any definite conclusion which can be drawn from statistical records. This is only what we may expect when we recollect the intrinsic difficulties and differences arising in all of these operative procedures. Obviously, the exact suitability of this or that method to any individual case must vary according to its nature and local complications. A general survey of the experiences of a large number of operators, and the results of some thousands of cases, shows that the special applicability of any mode of manipulation must be determined by, and made subservient to, the particular necessities of the type of tumour which is at the moment being dealt with. The main aims of all operators, and in every abdominal operation, can be summarized as follows:—

(*a*) Reduction of the time of operation to the lowest possible period compatible with its complete performance.

(*b*) Protection of the bowel from injury, and possible subsequent adhesions and consequent obstruction.

(*c*) Complete hæmostasis.

(*d*) The prevention of shock.

(*e*) Avoidance of injury to the bladder and ureters.

(*f*) Thorough asepsis.

Whichever operation, to the surgeon's mind, covers most completely these safeguards from the risks inseparable from the performance of most grave cœliotomies or vaginal hysterectomies, is the one that he should select, and there is the further important consideration that he alone knows the kind of procedure in which he has the greatest confidence in his own operative skill to complete, of which he has the largest experience, and which he personally believes will give to that particular patient the largest proportion of chances of satisfactory recovery.

In previous editions of this work I went fully into the question of the statistical evidence as to the relative mortality of extra- and intra-peritoneal operations, and there can be no doubt that the balance of such testimony was in favour of the extra-peritoneal method. But the work which has been done since 1893 has conclusively shown that the various operations performed by the celio-vaginal and supra-vaginal (hystero-myomectomy) methods are the safest, and that they are capable of such modifications of technique as may be demanded by the peculiar conditions of the

tumour, and also afford the surgeon the greatest security for the successful accomplishment of those important, if not vital, objects just enumerated. We are justified in arriving at such a conclusion from a scrutiny of the results achieved by a host of distinguished continental, American, and British surgeons who have practised both procedures.

Within the last five years the mortality has decreased relatively with the improved aseptic and antiseptic precautions, more careful diagnosis and selection of cases for a given procedure, more perfect peritoneal adaptation and adjustment, more rapid and complete hæmostasis, less frequent use of the drainage tube, and a better differentiation of the cases in which drainage is indicated.

The mortality by any method of operation will depend upon the conditions and complications met with in the cases operated upon. The difference in the risks between various cases is great, and cannot often be determined before operation. Therefore, in stating such risk to the patient, as should always be done, a margin must be allowed for unforeseen accidents and obstacles. Allowance, too, must be made for extra danger in the case of very large tumours with ascertained adhesions situated deeply in the pelvic cavity, and involving the adjacent viscera.

Idiosyncrasies and temperament must also be well weighed, and the presence of any constitutional vice or lesion of the lung or kidney inquired into.

In the face of such conditions as cardiac disease, chronic asthma, general atheroma, or renal disease, the surgeon will pause before advising hysterectomy.

The mortality returns of the most expert operators vary widely, and we may take it that the risk involved in the most perfect removal of non-pediculated fibromata ranges from 5 to 10 per cent. In certain pedunculated cases, where the difficulty is not greater than that involved in an ordinary ovariotomy, the risk is not more than in the latter operation. The truth is, that each individual case of fibroma has associated with its removal its own particular danger, and it is wrong for any operator, on the ground of any favourable statistical table or successful run of operations, to minimize this danger to his patient.

The number of surgeons who will be called on to perform, or who will feel justified in attempting, some of these serious operations must always be comparatively small.

Symptoms demanding Operation.

It must, however, be of importance to the practitioner to recognize those symptoms, on the presence or recurrence of which he will recommend or acquiesce in so serious a step as hysterectomy. I do not speak of those cases in which there is no choice save operation, when life is seriously threatened either by the large size of the tumour, pelvic complications, pressure on the ureters and rectum, severe hæmorrhage, great suffering, suppuration, or interstitial changes in the tumour. The decision or the justification for operation for a fibroid tumour must depend on the answer to this question : Is the tumour at the moment a source of immediate danger to the life of the woman; and, if not, does it, by its rapidity of growth, its size or position, or the symptoms that it causes, render it more than probable that the pursual of an expectant attitude towards it will expose her to greater risks from such palliative treatment than those that must be incurred by the operation on that particular tumour in the individual case before us?

We are not justified in advising operation if we do not conscientiously feel that the danger of interference is at least not greater than that which would follow non-interference. There are, however, considerations to which weight has to be attached in arriving at a conclusion. There is the presence, constant or periodical, of pain that no treatment can alleviate; the obvious evidences in the woman's appearance, and from her history, that the tumour is gradually but certainly undermining her health, her social position being such as to prevent her taking advantage of palliative means of treatment, and compelling her to support herself or her family by her personal exertion. In short, a tumour that may be well borne and temporized with in the instance of one woman, will demand in the other, for the earning of her daily bread, and domestic considerations, operative interference.

Early Operation.—The determination of early operation after the discovery of a fibroid tumour of the uterus, will depend upon its position, size, comparative freedom of removal by such means, for example, as enucleation, myomectomy, or vaginal hysterectomy, or its treatment by ligation of the uterine arteries, or salpingo-oöphorectomy.

The tumour may complicate retroversion of the womb, may be connected with disordered mental states, and is frequently found associated with morbid conditions or tumours of the adnexa. Such

complications may demand its early removal. What must be insisted upon is, that the mere presence of a fibromyoma does not justify an operation. It may happen that a comparatively large tumour can with safety be temporized with, while a relatively smaller one must be removed. The fact cannot be overlooked that most women who suffer from tumours of the womb or the adnexa are more or less invalids. Discomfort, inability to walk, pain, hæmorrhage, constipation, bladder troubles, mental distress and apprehension, deprivation of social enjoyments, incapacity for fulfilling ordinary duties or those demanded by occupation, are common attendants upon these.

The majority of women who suffer thus will themselves demand that relief afforded by operation, even when distinctly told the maximum risk which they have to run in order to be cured.

The old idea of waiting for the menopause in order to give the tumour a chance of disappearance, has long since been exploded. All the risks of the approaching menopause are increased by its presence, and its dangers are accentuated. This has to be said on behalf of the advocates of hysterectomy in the early stages of the growth of fibroids, that the dangers attendant upon operation would be considerably diminished by their removal when of small size.

Here the operation of selection undoubtedly is myomectomy, if the tumour or tumours be suitable. As shown by the discussion at the Gynæcological Congress at Amsterdam (1899), the opinion tends in favour of early removal by the vagina in those cases of growing interstitial fibromata to which other procedures are not applicable in the most favourable circumstances. In any case the risk involved, by whatever operation is performed, should be fairly placed before the patient. If the operation has to be performed under circumstances that render it exceptionally dangerous, the percentage of deaths from interference *in that particular type of case* should be explained to her. This is my practice, and I may illustrate it by the following example:—

A lady consulted me who had suffered from a fibromyoma for some years. She was then anæmic, rather emaciated, and of a highly nervous and hysterical temperament. She suffered constant pain, and was unable to walk any distance. Active hæmorrhage had ceased. On examination I found the summit of the tumour reaching nearly to the umbilicus, and completely filling the pelvic basin. She had been seen by other gynæcologists, who had decided that though operation was the only course open, the risks were so great that it could not be advised. After giving my opinion to her friends, it was

resolved that, having heard what these risks were, she should decide for herself. I told her that I considered that *at least* one woman out of every ten operated upon would die from the operation itself; that I was willing to perform it, seeing the certain dangers which would arise if nothing were done to relieve her, but that the decision should rest with herself. She took a week to decide, and then resolved to have the operation.

The tumour * (Plate XI.) was readily exposed, and the cause of its fixation in the pelvis discovered to be adhesions which bound it deeply and posteriorly. When these were freed with the hand, the tumour was delivered by the elevator, and removed by myo-hysterectomy. It was of stony hardness. The patient made an excellent recovery. For a fortnight after the operation there was considerable anxiety from the threatening of syncope, and a rapid and dicrotic pulse.

It is of interest to note the most recent opinions of a few of the more prominent gynæcologists who were present at the Amsterdam Congress. Those of Doyen are as follows :—

The surgical treatment of fibromyomata consists in their ablation. Bilateral salpingo-oöphorectomy by laparotomy is generally abandoned, and is only indicated as a supplement to ovariotomy when uterine fibromas are present which have not been the cause of the graver symptoms.

The removal of fibromyomas should be made by the vaginal route when this method is easy of performance.

Laparotomy is preferable when vaginal hysterectomy presents any real difficulties.

The operation of selection for interstitial fibromas, multiple and large, is abdominal pan-hysterectomy with sub-peritoneal decortication of the inferior segment of the uterus and closure of the pelvic peritoneum.

The conclusions of Schauta, drawn up for the same Congress, may be thus briefly summarized :—

Operative interference is not warranted unless other treatment be futile.

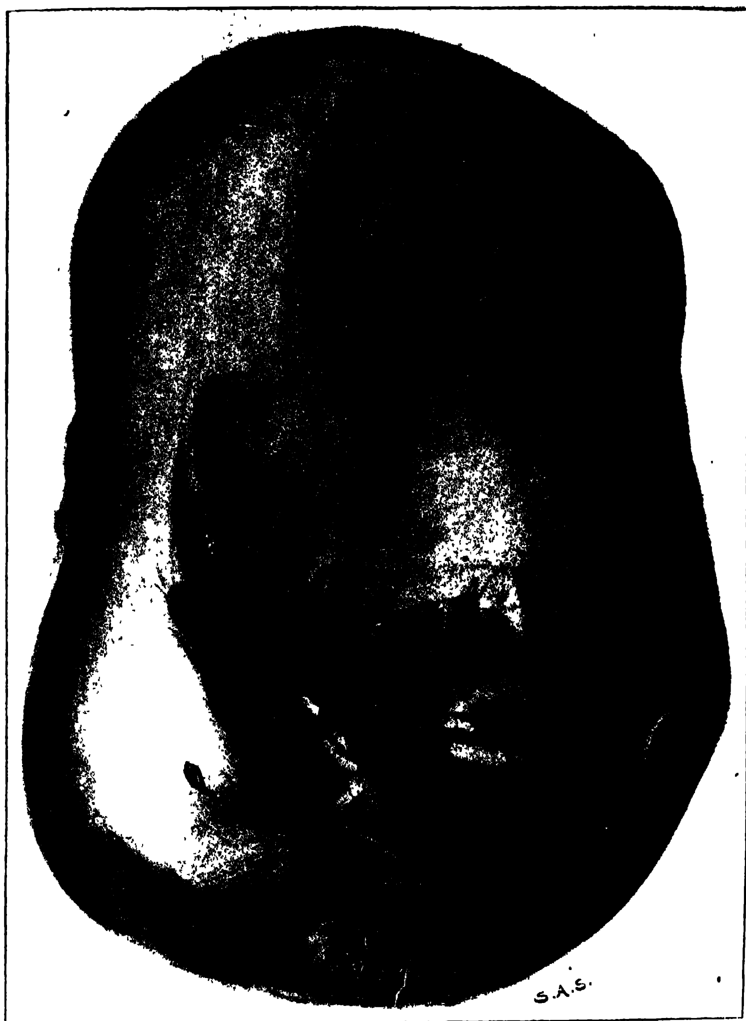
Vaginal total extirpation is the safest, and eventually the most successful, operation.

It is indicated in all cases when the tumour does not reach beyond the level of the umbilicus, and when it can easily be brought down to the outlet.

Large or partially fixed tumours, in part or entirely intraligamentous, should preferably be removed by pan-hysterectomy.

* *British Gynæcological Journal*, Nov., 1899.

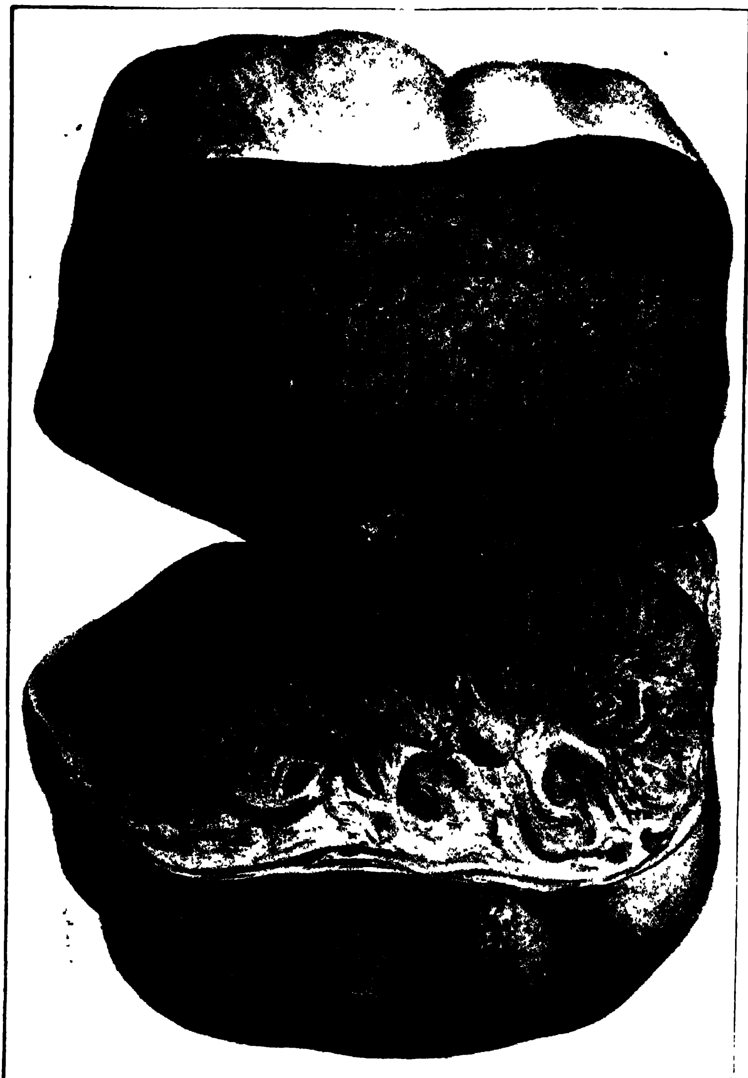
PLATE XI



LARGE DENSE FIBROMA, OF STONY HARDNESS, FILLING THE PELVIC CAVITY, AND FIXED BY ADHESIONS TO THE RECTUM AND FLOOR OF THE PELVIS. Removed by Myo-hysterectomy. Recovery; no complications. (Author.)

[*To face p.* 432.

PLATE XII.



Large Fibromata of the Uterus, showing its Reticulated Structure removed by Supra-Vaginal Hysterectomy. Recovery. (Author.)

[*To face p.* 433

He contrasts unfavourably supra-vaginal hysterectomy with abdominal pan-hysterectomy, reserving the former operation with extra-peritoneal treatment of the stump, for emergency cases in which there are constitutional conditions, when speedy removal is indicated.

Schauta does not approve of vaginal enucleation of broad base sub-mucous tumours, either through the cervix by the vaginal fornix, or colpotomy, save in rare cases. Curettage is a most uncertain method of treatment, and should be reserved for early myomatous development, and it is not free from danger. He objects to oöphorectomy, except in rare cases. He approves of ligature rather than forci-pressure. He insists on the value of drainage of the supra-vaginal wound in abdominal as well as abdominal pan-hysterectomy.

With regard to this question of the early removal of fibromyomata, Noble thus refers to the expediency of interference :—

'I am not yet ready to accept the proposition that every fibroid tumour should be removed as soon as it is discovered; but I am convinced that this plan of procedure would be much better than the one that has prevailed up to the present time. Granted that the rule is that the subjects of fibroid tumours become invalids for many years, even if they do not lose their lives it follows that, if they can be safely relieved of their tumours, this is urgently necessary to save them from weary years of suffering. It is difficult to estimate the actual danger to life of fibroid tumours, but it is not inconsiderable. If these tumours can be removed with approximately the same mortality, we have as an argument in favour of such removal the many years of suffering which thus will be prevented. At the present time hysterectomy is done only for the larger fibroids, and for those which are directly threatening the life of the patient; yet in the hands of our best operators, under these conditions, hysterectomy is done with a mortality approaching five per cent. Were the indications for the operation extended and these tumours removed when still small, I believe that this could be done with a mortality of not more than one or two per cent. This being the case, the benefits of operation should be stated to all women having fibroid tumours.' *

It is interesting to note what a distinguished woman gynæcologist has to say in this connection. Mary Dixon Jones, in the *British Gynæcological Journal*, Feb., 1898, says : 'I do not believe a woman can have a fibroid tumour, however small, without having direct and sympathetic trouble, for the tumours not only may produce various uterine displacements, with the accompanying evils and distresses, but they encroach upon normal structure, derange, change, and destroy it, disturb normal functions, are a constant irritation to the organic system of the uterus, and, by sympathetic

* *International Medical Magazine*, Dec., 1893.

troubles and reflex irritations, the injuries they produce are more than we can measure or calculate. They render the whole being physically and morally incompetent, nature is intolerant of them, and the patients are worn out by the disorders resulting from them.'

She further contrasts the burden of a child in utero in its psychical and physiological effects, with those attendant upon the dead burden of a fibroma. 'No hope of relief, no anticipation, only a sickening prospect, gloomy forebodings, and the saddest possibilities.'

Ligation of the Uterine and Ovarian Arteries.

As a substitute both for hysterectomy and oöphorectomy, several surgeons, notably Robinson and Martin, of Chicago, have ligated the uterine and ovarian vessels to check hæmorrhage and induce atrophy of the tumour.

In Martin's operation, the cervix, having been well exposed by retractors, is transfixed with a strong silk ligature, any secretion from the uterine canal being restrained by a tampon of gauze, over which the ligature is tied. The uterus having been drawn down, the left vaginal vault is exposed (Fig. 326), and the mucous membrane at the utero-vaginal junction is incised with curved scissors; one blade is then entered, and a curved incision about 2 inches in length is carried over the broad ligament at right angles to it. An index-finger of each hand is now introduced (Fig. 327), and the vaginal tissue is detached from the broad ligament in front of the bladder for a space of 2 inches in height, and the same distance to the side. In doing this the ureter is pushed out of reach. The same plan is adopted posteriorly. The peritoneum is not injured. The base of the broad ligament for a distance of 1 inch to 1¼ inches from the uterus is grasped in the manner shown in the drawing (Fig. 328). Finally, a needle threaded with No. 12 braided silk, guided by the index-finger, is carried behind the broad ligament clear of all pulsating vessels, and made to penetrate it.

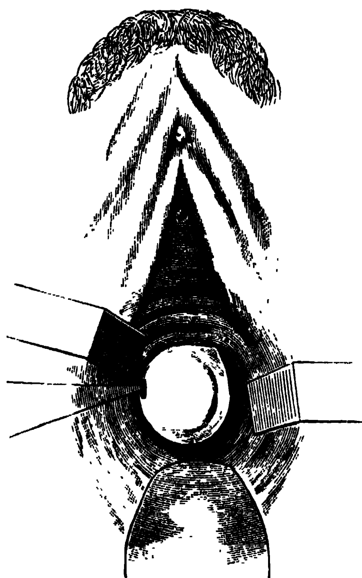


FIG. 326.—SHOWS INCISION OVER LEFT BROAD LIGAMENT. (Martin.)

Thus the base of the broad ligament is ligatured firmly a full inch from the uterus. The ligature is cut short and allowed to retract. The opposite side having been similarly dealt with, both vaginal incisions are carefully closed with catgut, thus completely burying the silk. The cervical handling-



Fig. 327.—Separation of the Broad Ligament with the Fingers.



Fig. 328.—Grasping the Base of the Broad Ligament.

string is withdrawn, and the vagina packed with iodoform gauze. The subsequent treatment is simple. Thorough antisepsis being maintained, the vaginal wound is healed in about a week.

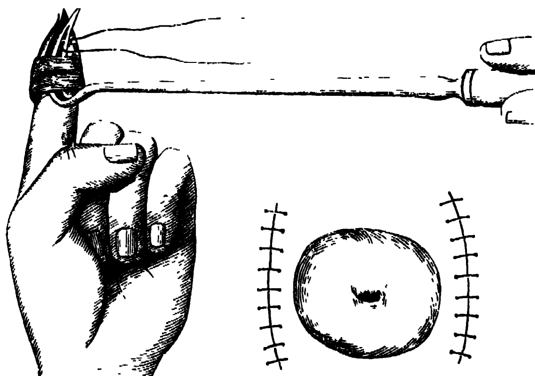


Fig. 329.—Ligaturing Base of Broad Ligament; Vaginal Incision closed.

Torsion of Uterus.—This is a comparatively rare condition, only some thirty-five cases being recorded. Ehrendorfer ascribes it to the resistance offered to the growth of the tumour by the obstruction from the pelvic wall.

Myomata cause torsion of the uterus in about 50 per cent. of the cases in which it occurs, ovarian tumours the remainder. Pregnancy with ovarian tumour predisposes to the rotation. With the uterus the ovaries are also frequently displaced and out of position. Torsion gives rise to a variety of symptoms due to congestion, necrosis, and peritonitis.

CHAPTER XXIII.

SURGICAL TREATMENT OF UTERINE FIBROMYOMATA (continued).

ABDOMINAL PAN-HYSTERECTOMY.

IN the last edition of this work I fully described the details of the various methods of performing extra-peritoneal hysterectomy. The methods of compressing and securing the pedicle, as practised by Kœberlé, Lawson Tait, Pozzi, Taylor, Greig Smith, Hégar, Kaltenbach, and Doléris, were entered into, and the different appliances used in the operation by these surgeons were illustrated. For reasons before mentioned, I do not now consider it necessary to include these procedures. I therefore pass immediately to the consideration of abdominal intra-peritoneal pan-hysterectomy (oöphoro-salpingo-hysterectomy), and that of hystero-myomectomy (supra-vaginal hysterectomy with or without removal of one or both adnexa). The indications for the operation have already been fully entered into.

Appliances required for Abdominal Pan-Hysterectomy.

In the chapter on Asepsis and Antisepsis I have already referred to all the preliminary steps in the preparation of the room, the nurses, assistants, patient, and the appliances necessary, previous to a laparotomy operation. In abdominal hysterectomy it is well to have all the following instruments sterilized and ready to hand. Drawings of all the appliances named in the text are in this chapter:—

A few scalpels and a straight blunt-pointed bistoury.

A number of Péan's or Wells' and Doyen's hæmostatic forceps.

A few of Doyen's artery forceps.

Some variously curved, sharp-pointed, and blunt scissors.

A tumour elevator or *griffe* of Doyen; failing these, a corkscrew elevator, preferably Doyen's helicoid.

Tenacula, single and double.

Clamps, slender, strong, and curved.

Light clamp forceps for sponges or dabs.
Retractors—glass (author's) or other.
Broad ligament needles of various sizes.
Various-sized curved needles.
Needle-holders.
Paquelin's cautery.
A rope écraseur (like that of Tait).

Nearly all the instruments figured in the accompanying illustrations are in use in my operating-room.*

Steps of the Operation—Preliminary Incision—Exposure of Tumour—Its Delivery.—Up to a certain stage the steps are the same in every intra-peritoneal operation. A reference to the chapter dealing with the aseptic and antiseptic preparation of the patient and her surroundings, will show all the needful preparation up to the com-

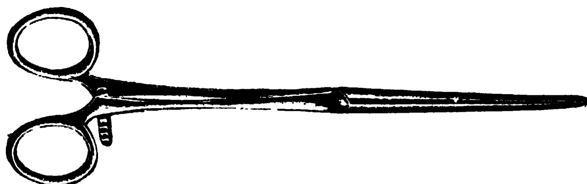


FIG. 330.—SLENDER CLAMP, WHICH CAN BE USED ALSO AS SPONGE AND GAUZE-DAB HOLDER.

mencement of the operation itself, and the making of the abdominal incision.

The incision varies in length according to the size of the tumour to be removed. It may have to be prolonged upwards by scissors or bistoury. The surgeon keeps in the middle line, avoiding the



FIG. 331.—WELLS' HÆMOSTATIC AND TORSION FORCEPS.

rectus sheath. Should he open the sheath of the rectus, he completes the incision by cutting directly through the muscle. Some surgeons prefer to open the abdomen through the rectus

* I have to thank Messrs. Arnold for engraving the drawings of all the new models shown in the text throughout the work.

muscle. I frequently do so. It is argued that by so doing the risks of hernia are lessened.

Hæmostatic forceps are now applied to the bleeding points, and all hæmorrhage is arrested by forci-pressure or by fine silk ligature. It is wise not to make the first incision longer than five inches, and not to approach too close to the symphysis. The peritoneum is opened by holding it well up with two dressing forceps and dividing it with a scalpel horizontally between the two. It is next incised to the necessary extent with a straight blunt-pointed bistoury on the finger, or a flat-grooved director. The position of the fundus of the bladder is determined by the introduction of a sound. Catch forceps are then applied to the peritoneal margins on either side, which are thus readily held apart.

The tumour is next examined by the hand introduced into the wound, and its extent carefully determined. Its depth in the pelvic

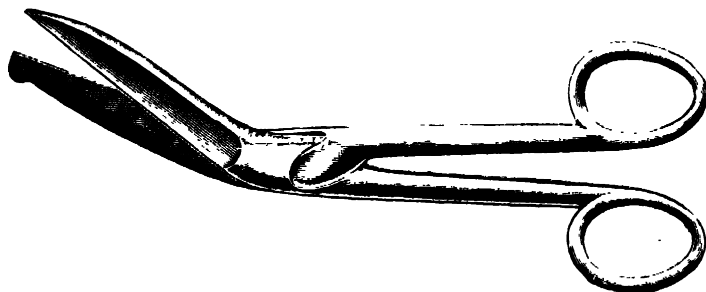


FIG. 332.—BLUNT-POINTED SCISSORS.

cavity, the form of its pedicle, and the extent of the adhesions (if any) are ascertained.

Here, if it be thought necessary, the length of the abdominal opening is increased; this may be done with strong-angled blunt-pointed scissors (Fig. 332). It may even have to be prolonged by the side of the umbilicus as far as the xiphoid appendix.

The next step is the separation of the parietal adhesions, if they be present; this may be done with the finger. Care must be taken, in cases where there have been previous attacks of general peritonitis, lest the bowel be so adherent to the peritoneum that it runs the risk of being opened when the latter is incised.

In a case of removal of a sanguineous cyst from the broad ligament which I operated upon recently, the firmness of the adhesions between the bowel and the peritoneum was such that it could not be detached, and I had to find

a lateral portion of the peritoneum lower down, in which the opening was made.

Small bleeding points are treated by torsion, and any bleeding portion of separated adhesion or membrane is secured by a fine silk or gut ligature. If the day be dark and the light defective the lamp already shown in the chapter on Asepsis is used, and the forehead reflector here figured can be availed of to throw the light into the pelvic cavity.

Retractors are useful for drawing the abdominal wall at either



FIG. 333.—FOREHEAD REFLECTOR.

side apart, and the glass ones devised by me are very convenient for this purpose (Fig. 334). The extreme Trendelenburg position may be necessary in some cases to thoroughly expose the pelvis and assist in the management of adhesions and the control of bleeding points.

The delivery of the tumour is frequently a matter of considerable difficulty, and has to be conducted with the greatest care. Adhesions may be torn through by roughness, and the viscera thus injured. It is also of importance to avoid bruising the parietes, thus injuring their vitality. If we find that we cannot deliver the myoma in

consequence of its depth in the pelvis, or the associated myomatous growths between the layers of the broad ligament, we must proceed to divide and ligature the latter, or temporary compression of the ligament is made in the manner to be described, allowing of its section at either side, so as to secure the delivery of the tumour.

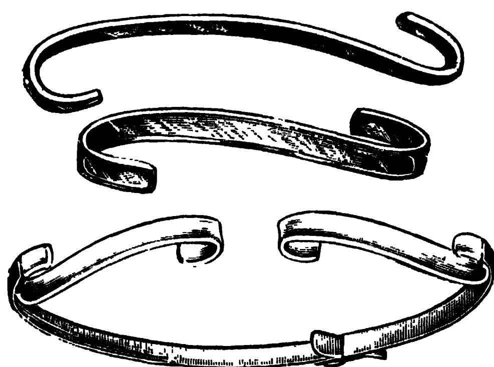


FIG. 334.—GLASS RETRACTORS OF AUTHOR (self-retaining if required).

The late Greig Smith placed a broad ligament pressure forceps at either side of the uterus outside the ovary and Fallopian tube. These he allowed to remain on until the tumour was removed. Next he carried a silk ligature below the point of the forceps through the ligament close to the uterus, and while this was tightened, the broad ligament was divided close to the blades of the forceps. The advantage of this synchronous and gradual method of ligation and section of the ligament, as he pointed out, is in enabling us to most effectually secure the tissues, in which are included the ovarian artery and its anastomoses, with the uterine vessel, as also the accompanying venous plexus, often more formidable to deal with than the arteries. This process may have to be repeated a few times lower down in the pelvis.

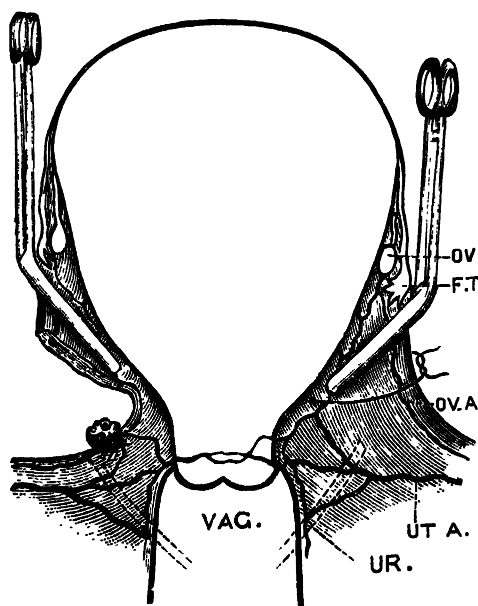
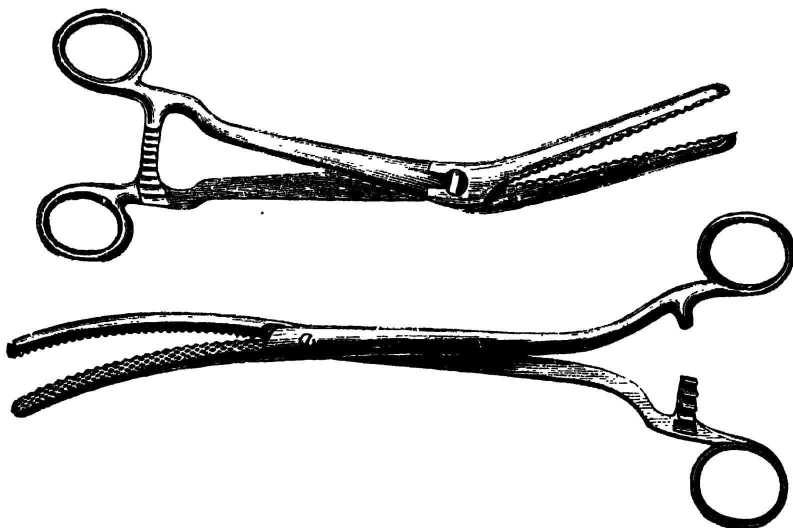


FIG. 335.—LIGATION AND DIVISION OF BROAD LIGAMENTS IN HYSTERECTOMY FOR MYOMA. Forceps are placed on both ligaments outside the ovaries and tubes; on the left side the ligature is placed; on the right it is tied and the ligature is divided. (Greig Smith.)

At other times two pressure forceps may have to be applied at either side, and the ligament divided between them, the outer pair being allowed to remain until after the tumour is delivered, when the ligament is ligatured. This is, broadly speaking, the method followed in ordinary cases. But of course the special difficulties due to the attachments of the tumour, its depth in the pelvis, the stretching of the broad ligaments, and the displacement of the ureters, must demand the adoption of different plans suitable to the individual difficulties met with in each case.



FIGS. 336, 337.—GREIG SMITH'S BROAD LIGAMENT AND CLAMP FORCEPS.

The delivery of the tumour and its extrication from the pelvis may be assisted by its elevation by means of pressure made through the vagina by an assistant. The corkscrew of Tait, the helicoid or *griffe* of Doyen (Figs. 356, 357), or the elevator of Reverdin (Fig. 61), are of use in the delivery of large myomata.

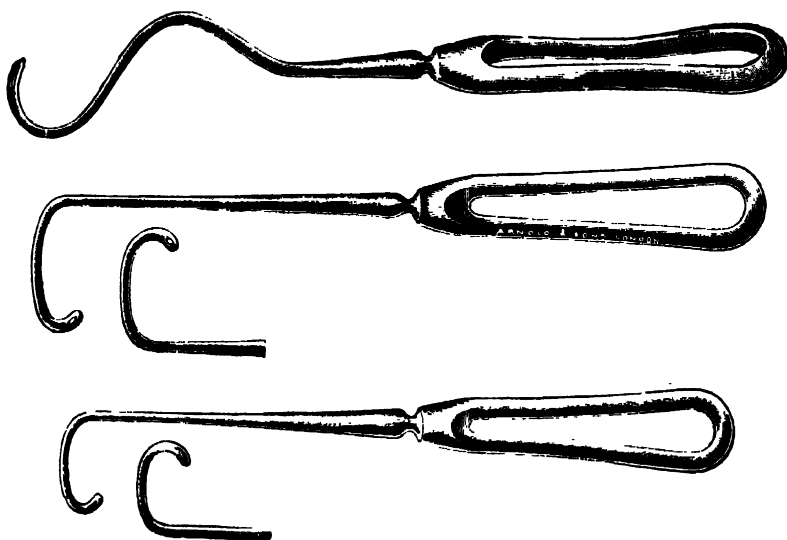
In the delivery of some myomata, the manipulation of pelvic, omental, and intestinal adhesions may demand time, and call for the greatest skill and delicacy on the part of the operator.* This no book can teach, nor detailed description ensure. The omentum and bowel have to be carefully covered by warm *toile,* cotton gauze, or flat sponges. Should the intestine be inadvertently or unavoidably opened, it must be immediately closed by suture, and that of Lembert should be chosen for preference.

Vesical adhesions offer considerable difficulties. In separating

* See remarks on the Complications of Hysterectomy.

these, a sound should be passed into the bladder as a guide. If there be danger of its being wounded, and if it be expanded over the face of the tumour, the sound is a guide to its position. The bladder must then be separated from the tumour by the thumb or finger nail. Cases have been published in which the bladder reached to the umbilicus. It did so in a case of my own where the operation was performed for double pyo-salpinx.

If the bladder wall be wounded, it must be immediately closed by gut or fine silk sutures, as in the instance of the intestines. It may be found that, owing to the extent of the adhesions, shortness of pedicle, and depth of tumour, it is impossible to deliver it. Then



FIGS. 338-340.—OLSHAUSEN'S BROAD LIGAMENT NEEDLES (STRAIGHT AND DOUBLE CURVED).

the tumour has to be dealt with by one of the other methods we shall refer to. In clearing it in front, the ureters may be wounded. The degree of laceration and displacement of the tube must influence the course to be pursued. Some surgeons have performed immediate nephrectomy of the corresponding kidney.

Pozzi advises, when the ureter is still in position, a fine ureteral catheter or sound to be passed into the ureter from the bladder as far as the tear, which is then carefully sutured with fine gut.

In the case of more severe lacerations, he advises the establishment of a lumbar ureteral fistula with the end of the upper portion of the ureter. A

ureteral sound is then applied, and the peritoneum is antiseptically tamponned to prevent the infiltration of urine, to a level with the vesical end, which is tied and fixed to the lower end of the abdominal wound.

(Consult chapter on the Surgery of the Ureters.)

When the tumour has been withdrawn from the abdominal cavity it is supported by an assistant, and its pedicle is temporarily secured by a strong clamp forceps. The intestines are carefully

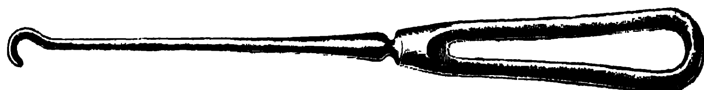


FIG. 341.—HOOK FOR CATCHING THE LOOP OF LIGATURE.

protected, and all bleeding points are secured. This protection of the peritoneum and intestine is a matter of the greatest moment when the operation is likely to be prolonged, or, from the size of the incision after the delivery of the tumour, they are liable to exposure or extrusion. Such attention to the intestines should be borne in mind, and the nurse prepared with warm compresses or

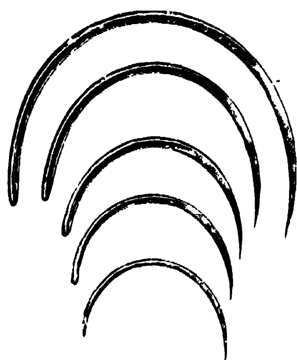


FIG. 342.—CURVED NEEDLES. Patterns used by Author *

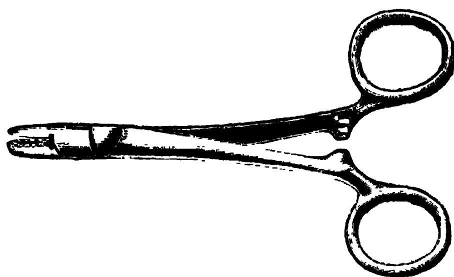


FIG. 343.—DOYEN'S PERITONEAL NEEDLE-HOLDER.

sponges to replace others from time to time. Should the intestines be extruded, the utmost care must be taken to prevent chilling and the effects of evaporation. They should be covered with warm cloths, wrung out of sterilized water, under protective material. Maunsell devised a useful guard for this purpose, a frame of copper

* The steel of these needles must be carefully tempered so that they will stand both considerable strain in use and also the pressure of the clamp needle-holder.

wire covered with rubber tubing over which layers of aseptic gauze are stretched.

Ligature and Division of the Broad Ligaments.—Before proceeding to apply the ligatures, the surgeon carefully examines the adnexa and broad ligaments at either side, ascertaining if there be any tumours or cysts of the adnexa, and the relations of the latter to the tumour. He should get a good idea of the position of the cervix, and the line of utero-vesical-peritoneal reflexion. Any deviation from the usual position or course of the ureters is sought for, and it may be possible to palpate them in their passage to the bladder. He next proceeds to ligature the broad ligament at one side, using the curved needle of Olshausen for this purpose. If we intend to remove the tube and ovary, a ligature is passed outside these and firmly tied, another is carried close to the uterine wall, and the broad ligament is divided. The same manœuvre is carried out at



FIG. 344.—JESSETT'S BIVALVE OBTURATOR.

the other side. The ovarian arteries have now been both secured. Any bleeding vessels on the uterine side can be temporarily caught with Wells' forceps.

If the adnexa are healthy, they may be left, or those of one side only removed. The middle portion of the broad ligament to the level of the internal os is next ligatured at either side.

The sound in the bladder indicates the line of peritoneal reflexion and attachment. A curved incision is carried from one broad ligament to the other, across the anterior surface of the uterus, and through the sub-serous connective tissue. With the thumb or a small sponge on a holder, which is much better, the detachment of the bladder is effected as far as the vagina. An obturator, passed into the vagina and pushed upwards, will indicate the point where the vagina may be opened, which is done by cutting on the obturator or a long curved forceps, the blades of which can be

separated to stretch the vaginal vault and enlarge the opening, with a curved scissors. The finger may be used to enlarge the opening. The posterior fornix is now put on the stretch by hooking the finger through the opening just made and drawing on the cervix, while at the same time it is used as a guide, or the cervix may be seized by Doyen's *érigne* (Fig. 361), and drawn backwards and forwards or to



FIG. 345.—DOYEN'S LONG FORCEPS FOR SEIZING THE ARTERY AND DRAWING IT OUT FOR LIGATURE.

either side. This opening is likewise enlarged with the finger. The next step consists in the ligaturing of the uterine arteries and the severing of the uterus. This involves the avoidance of the two most serious accidents incidental to the operation—hæmorrhage and wound of the ureter. The liability to one or other will depend

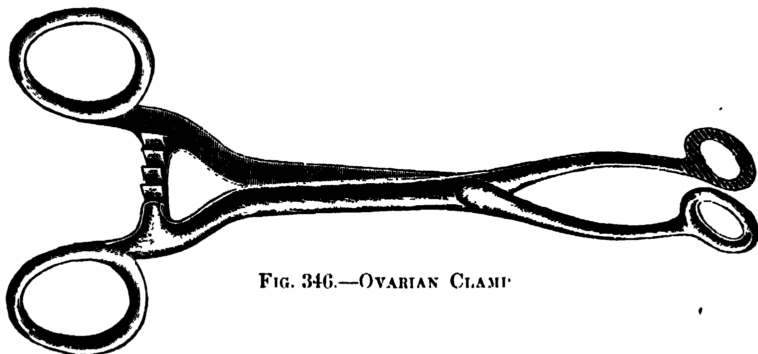


FIG. 346.—OVARIAN CLAMP.

upon the care and deliberation with which the step is conducted, and the probability of either accident occurring will be largely influenced by the character of the tumour, its shape, depth in the pelvis, the height to which the ureters are carried by the mass, and the disposition of the uterine vessels. Sometimes the uterine artery

or a branch is wounded unexpectedly through a high division in making the second section through the broad ligament. Should this occur, it is immediately seized with a Doyen's forceps, drawn well out, and tied. The curved needle is passed as close as possible to the uterine neck, so as to avoid the ureter. The curved scissors, with the convexity turned towards the uterus, cuts close into the uterine tissue. This is done at both sides of the cervix, and finally the uterus with its tumour is completely delivered.

Any bleeding points are now sought for, and each in turn secured with silk or gut ligature. The source of any oozing is patiently looked for and controlled, whether in the pelvis or from the cut vaginal surface. This must be done with the patient thrown well into the Trendelenburg position, and, if necessary, by the light of the forehead electric photophone, or the electric mirror (Fig. 333). The

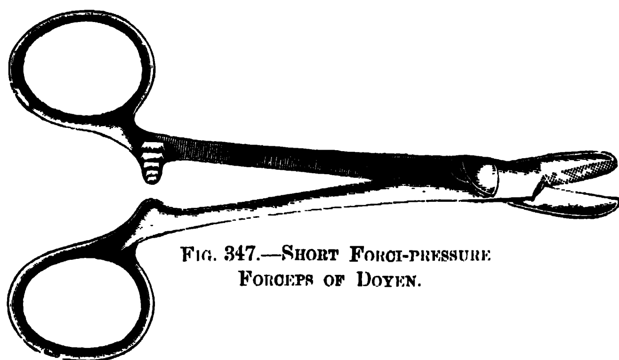


FIG. 347.—SHORT FORCI-PRESSURE FORCEPS OF DOYEN.

pelvis is now thoroughly dried out with compresses of sterilized gauze, and, when all is perfectly clean and dry, a roll of iodoform gauze is carried from above down into the vagina, a small portion only left projecting into the peritoneal cavity. The peritoneal flaps are now sewn with continuous or interrupted silk sutures, and any rents in the broad ligament are carefully closed. The pedicles of the adnexa, if the latter are removed,. are covered with peritoneum, and finally the vaginal opening with the peritoneum is sutured over the gauze.

Looking down from above on the pelvic basin, in the completed operation no jagged or exposed surfaces are seen, the peritoneal edges are carefully approximated, leaving one continuous smooth and clean surface. If the case has been complicated with severe hæmorrhage, and we fear further oozing, or if there have been



FIG. 348.—PASSAGE OF THE DOUBLE LIGATURE AT UPPER THIRD OF BROAD LIGAMENT. (C. Martin.)



FIG. 349.—SUCCESSIVE LIGATURES OF BROAD LIGAMENT. (C. Martin.)

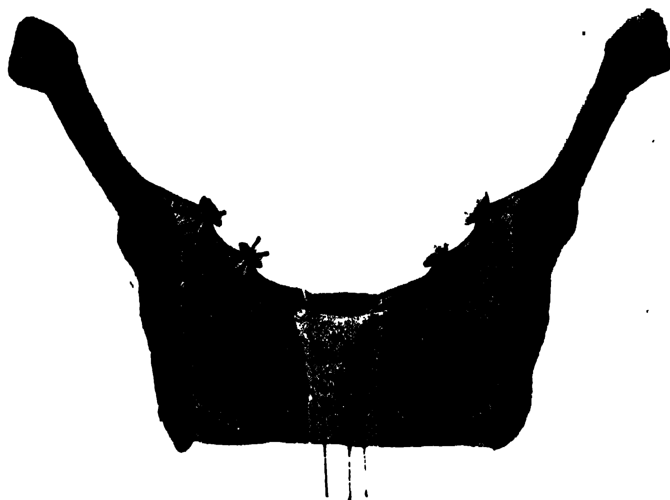


FIG. 350.—LIGATURE CUT SHORT AND PEDICLE DROPPED. (C. Martin.)



FIG. 351.—ROLL OF IODOFORM GAUZE DRAWN DOWN THROUGH THE VAGINA, LEAVING AN INCH ABOVE IT. (C. Martin.)

adnexal complications, such as cystic and dermoid tumours, or hæmato- or pyo-salpinx, and the contents of the cysts or sacs have escaped during the operation, it is better to leave the vaginal opening unclosed, and to let the iodoform roll act as an efficient drain. Some more gauze is carried into the vagina from below. Within a few days the peritoneal cavity is shut off by a layer of encapsuled lymph, and thus infection from below is prevented.

The abdominal toilet is now completed, the peritoneal edges are brought together, and are united by a continuous or interrupted

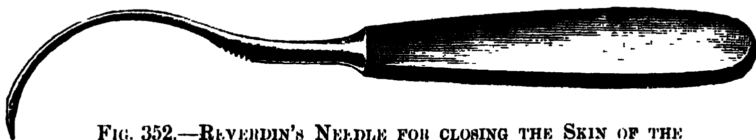


FIG. 352.—REVERDIN'S NEEDLE FOR CLOSING THE SKIN OF THE ABDOMINAL WOUND.

suture of fine silk; the muscle and fascia are next sutured with gut of medium consistence, special care being taken to bring the edges of the aponeurosis into accurate line (Noble makes its margins to overlap, and thus stitches it). Finally, the skin margins are united with silkworm gut. Drainage is rarely required—never when there has been an aseptic operation, and if all bleeding has been thoroughly arrested. If, however, there has been any suppurative conditions of the adnexa, and pus has escaped into the peritoneum, or there has been an escape of blood into the pelvic cavity, and there is a

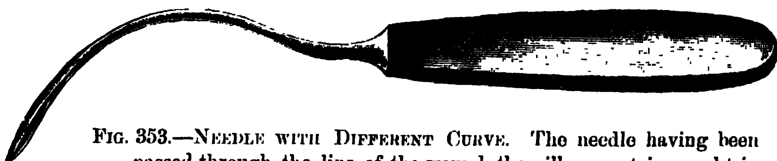


FIG. 353.—NEEDLE WITH DIFFERENT CURVE. The needle having been passed through the lips of the wound, the silk or gut is caught in the notch, and it is drawn back.

certainty of serous oozing following the operation, it is well to drain. This may be done either with a rubber tube, which has been sterilized, or by a sterilized iodoform gauze drain. The drain should be removed as soon as possible.

Clark, from the 1700 laparotomies performed in Johns Hopkins Hospital, 1889-1896, concludes that intra-peritoneal drainage is generally useless, sometimes absolutely hurtful, and that there is no indication for it except in the following cases: when in a case of appendicitis or perforation of the vermiform appendix, inflammatory

infiltration of the surrounding tissue makes it impossible to close the wound; when there is reason to suspect the stability of an intestinal suture; in the incision of abdominal fistulæ, and in purulent peritonitis. Vaginal drainage is indicated in the evacuation of localized collections of pus in the pelvis.*

Snégireff's Hysterectomy Operation.†

After the incision has been made, and the patient placed in the Trendelenburg position, 'the tumour having been delivered, two incisions are made on each side of the uterus parallel to the insertions of the broad ligaments, front and back. The lower ends of these incisions in front are joined by a horizontal incision above the bladder boundary, and those behind are joined similarly by an incision 2 cm. above the floor of the pouch of Douglas. The upper ends of the incisions do not quite reach the points of origin of the Fallopian tubes. The peritoneal covering of the uterus is stripped off quickly in correspondence with the incisions. Through the slit (in the broad ligament) thus formed, a stout catgut ligature is passed by means of Deschamp's needle and tied beneath the appendages, so as to include all the vascular branches on the front and sides of the uterus. Forceps with long blades are then applied to the uterine ends of the ovarian and round ligament and of the Fallopian tube. The broad ligament is next cut through and worked off the side of the uterus between the point of ligature and the clamp. This is repeated on the other side.

'The tumour having been thus freed on both sides, the next step is to detach it from the bladder. By drawing the uterus upwards and outwards, one can make out the vesical artery almost to its branches. These are tied by catgut sutures passed with Deschamp's needle and cut through above the ligature. In this way the cervix becomes free in front and at the sides, and the posterior peritoneum is separated down until the vaginal portion of the cervix is detached from it. The posterior wall is now cut through with a knife, and the margin of the vaginal mucous membrane is caught up with Kocher's forceps and the cervix is cleared with the knife laterally and in front. The tumour and whole uterus are thus isolated. The vaginal walls and the bleeding vessels are seized in Kocher's forceps and tied with catgut. The uterine appendages are cut off below the points of application of the clamps, the abdominal cavity is cleaned and a pair of long-bladed curved forceps are passed through the vagina, and the long sutures upon the broad ligaments are caught in them; thus the stumps of the broad ligaments are drawn into the vagina. The ligatures are fixed with Péan's forceps and the anterior and posterior peritoneal flaps are sewn together from the peritoneal aspect with continuous catgut suture, by which the vaginal and the depressed broad ligament stump are completely excluded from the peritoneal cavity. A Mikulicz drain is placed in the floor of the pelvis. The patient is put into

*** See chapter on Asepsis and Antisepsis for remarks on abdominal toilet. Consult also the chapter on the Post-operative Treatment.**

† Edge, *British Gynæcological Journal*, Aug., 1896.

the horizontal position, and the abdominal incision is closed with deep and superficial sutures. The iodoform gauze is carried out through the vagina, and the abdominal wound is covered with a binder. Thus no sutures are left in the peritoneal cavity; no wound surface is left above; if bleeding occur, it will be intra-peritoneal. The vaginal gauze is removed on the third to the fourth day, and the vagina is douched freely with lysol or sublimate solution.'

Position of the Adnexa.—It is important to bear in mind the relative position of the adnexa to certain tumours. This relation is dependent upon the mode of growth and the original point of development of the tumour. It will also be influenced by the shape and multiple nature of the fibroma. If, for example, the tumour should distend and fill the uterus, being of the submucous character, it will push the adnexa upwards towards the upper zone of the tumour. A sessile subperitoneal tumour, springing from the fundus of the tumour, will have the adnexa directly beneath its base, whereas, if it be pedunculated, they will be found in their usual position; a large multiple fibroid springing from the fundus, and depressing the uterine cavity, has them lying underneath its base and attached to it. A tumour developed in the posterior wall, and encroaching on the space of Douglas, will push the ovaries and tubes aside; the adnexa may thus be found either on the summit, or spread out on the side, of the tumour. So if it be developed in the lateral wall or in the broad ligament, the pelvic peritoneum and ovary will cover it. Associated perimetric conditions, such as salpingo-ovaritis, will cause adhesion and attachment of the adnexa.

Doyen has shown these several relations of the adnexa to various tumours in a series of schemes drawn from the conditions he found present in cases operated upon by him. In some of these the difficulty of securing permanent hæmostasis was necessarily great, if not well-nigh impossible.

Some Ordinary Complications.

Extreme Obesity.—A fat abdominal wall requires a correspondingly long incision, otherwise it will be found very difficult to see the parts, to deliver a tumour, or to manipulate within the abdomen.

Extensive Adhesions.—If after the first incision adhesions are detected by the fingers or hand, it must be extended with strong angular scissors, care being taken in cutting towards the bladder, which in some tumours or cysts lies rather high. The peritoneal opening is always of the same size as the external wound

The Presence of Pus.—The presence of free pus in the pelvic cavity, if detected with the patient in the Trendelenburg position, will necessitate immediate lowering of the table, with careful packing of the upper part of the abdomen and the exposed surface of the bowel with gauze and flat sponges.

Omental Adhesions.—If there be extensive omental adhesions, these must be carefully separated, the torn vessels promptly caught and ligatured, either with fine catgut or silk; and if there be a considerable portion of omentum bleeding, it may be ligatured with a chain ligature and cut away. I have recently removed a large ovarian cyst to the wall of which the omentum was extensively attached, necessitating the peeling of it off, and the removal of the greater part.

Rectal and Bladder Adhesions.—In detaching these, great care must be exercised in the use either of the finger-nail, handle of the knife, blunt scissors curved on the flat, or sponge. The best plan of proceeding is, with the point of the scissors or the finger-nail to work towards the uterus, and away from either viscus. Then, with a small sponge, or roll of gauze in a holder, we complete the detachment as far as we prudently can. We again resort to the nail or scissors, and repeat the peeling process with the sponge. In the event of its being impossible or rash to proceed with the separation of vesical adhesions, it is better to separate with the scissors a thin layer of the tumour tissue, which may be left attached.

Prolonged and Obstinate Hæmorrhage.—Should this occur low down in the pelvis, the full Trendelenburg position at an angle of 45° must be obtained; the bowel is carefully drawn up and protected. Strong artificial light, by the electric lamp or forehead

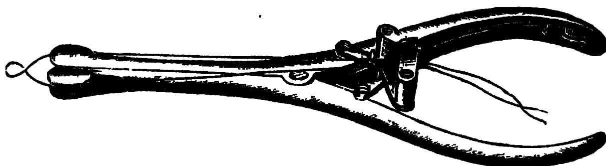


FIG. 354.—SCHAUTA'S LIGATURE TIGHTENER.

mirror, is thrown into the pelvis; the sources of the bleeding determined, and ligatured, if necessary, with Schauta's ligature tightener. If there be general oozing, or the patient's condition forbids further efforts to see and secure vessels, a sterilized

gauze pack should be tightly packed over the bleeding surface. With the long, light clamp needle-holder of Olshausen, it is not difficult to carry a fine needle deep into the pelvis, and, by dipping it, secure the bleeding vessel or vessels.

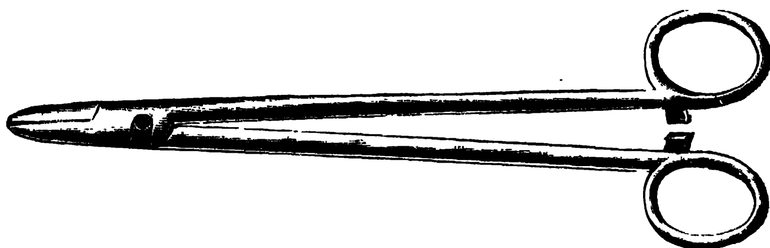


FIG. 355.—OLSHAUSEN'S NEEDLE-HOLDER.

Shock during Operation, or immediately after.—When any or all of the conditions I have enumerated so complicate an operation that its duration is considerably prolonged, or there has been such loss of bleeding that the patient's life is endangered, shock may occur, and demand immediate attention. A subcutaneous injection of ether or strychnine should be given, a stimulating enema may be passed into the bowel, and a sub-mammary injection of artificial serum administered. The anæsthetist is the one who is mainly responsible for the recognition of the symptoms ushering in shock: increased rapidity, with failure of the pulse, growing pallor, weakness of the respirations, and cold perspiration are the symptoms which should warn him of the danger.

After a long operation, when complications such as those mentioned have to be overcome, once the abdominal toilet has been made, which should be done as rapidly as possible, the patient must be moved from the operating-table with gentleness, and steps taken immediately to secure a proper temperature and the application of artificial warmth to the lower extremities. Should the symptoms of shock continue, another stimulating enema may be given after placing her in bed, and a second subcutaneous injection of ether, to be followed in a little time by one of strychnine.

Doyen's Operation of Abdominal Pan-Hysterectomy.

The first stage of the operation is similar to that which has been described. The tumour is then drawn forward, either by tenacula, or, if necessary, corkscrew tractors—"*helicoids.*" If there

be a pedicle, and the tumour can be drawn over the pubes, this is immediately done. The bowel is carefully protected, and the extirpation of the tumour is proceeded with. The second stage consists in the extirpation of the uterus and the hæmostasis of its pelvic attachments. This part of the operation he performs very quickly, and without the use of preventive clamps. A long curved forceps is introduced into the vagina, which has been

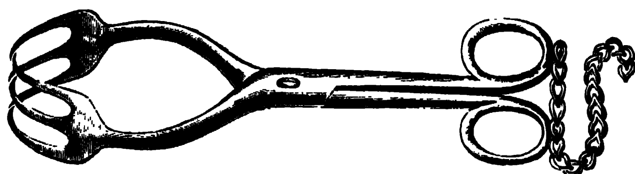


Fig. 356.—Griffe for seizing Tumour in Delivery. (Doyen.)

previously disinfected, and is pushed behind the neck of the uterus so as to protrude the posterior vaginal cul-de sac upwards as far as possible. By this means the exact height of the reflection of the anterior wall of the cul-de-sac of Douglas is defined, and a thick thread of silk is immediately passed about a centimetre above the point where the vagina has been opened. This suture serves at the

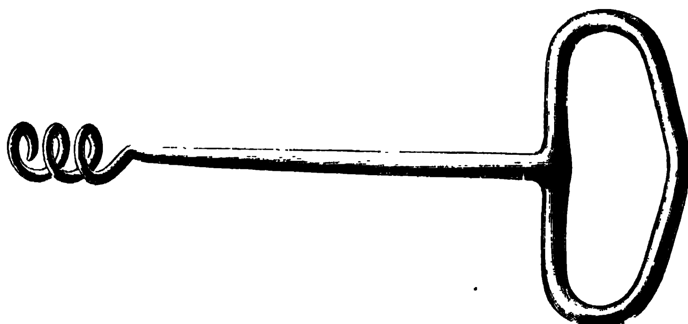


Fig. 357.—Érigne Hélecoide, for Delivery of Tumour. (Doyen.)
(See chapter on Asepsis for Reversing Elevator.)

end of the operation to draw up the posterior lip of the peritoneal wound and facilitate the closure of the vaginal orifice. A longitudinal incision is next made into the cul-de-sac of Douglas on the point of the forceps, either by bistoury or scissors. The opening is made sufficiently free. The surgeon now introduces the right index finger through the vaginal opening thus enlarged, and carries through it Doyen's *érigne* for seizing the cervix. This is plunged

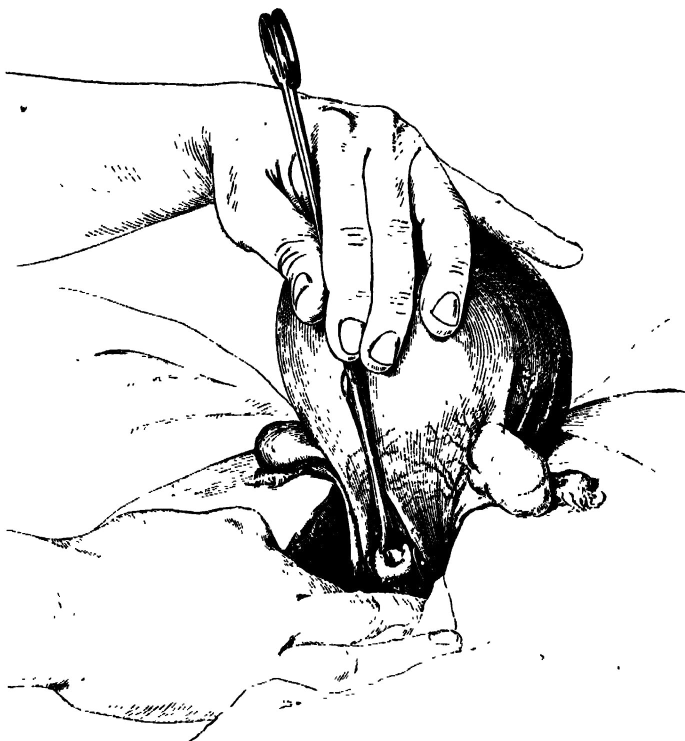


Fig. 358.—Opening of the Posterior Vaginal Cul-de-sac. (Doyen.)

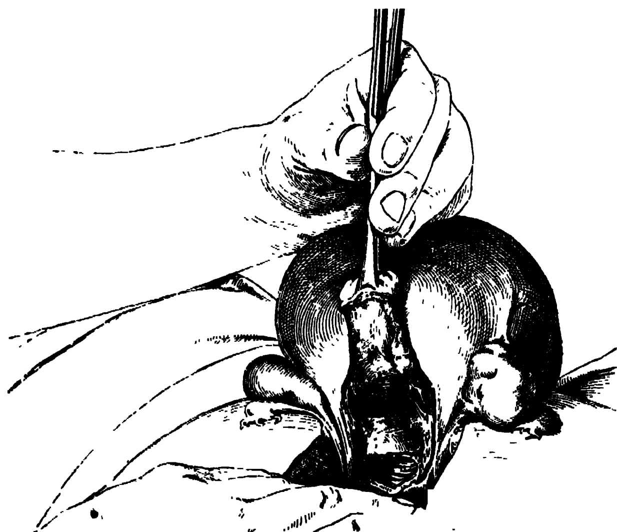


Fig. 359.—Incision of the Anterior Cul-de-sac—Raising of the Uterine Neck after its Detachment from the Bladder. (Doyen.)

into the anterior lip, or, if this be impossible, the posterior, and by it the neck is securely seized. This is then drawn up between the



FIG. 360.—THE RIGHT BROAD LIGAMENT IS DETACHED FROM THE UTERUS—THE TUMOUR IS TILTED TO THE LEFT—ADNEXA HELD IN THE HAND OF THE ASSISTANT. (Doyen.)

lips of the vaginal opening. With the left index finger, the lateral attachments are examined, and with a scissors or bistoury these



FIG. 361.—ÉRIGNE OF DOYEN CONTRIVED TO GRASP AND HOLD FIRMLY THE CERVICAL LIP OR NECK IN DRAWING IT UP BETWEEN THE LIPS OF THE VAGINAL OPENING.

attachments of the cervix, as far as the inferior border of the lateral ligament, are divided. Strong traction is made with the

érigne forceps. The anterior vaginal cul-de-sac is now seen, and the anterior lip of the cervix is seized with an ordinary claw forceps, if this be necessary, and the cul-de-sac is divided with the scissors at its contact with the cervix, still drawing forcibly with the forceps or *érigne.* With the right index finger the cervix is carefully separated from the bladder, and there is now no attachment of the uterus left save its lateral vascular connections.

It only remains to introduce the left forefinger above the right broad ligament in order to perforate the utero-vesical peritoneum, and, with the curved finger, to complete the detachment of the right broad ligament. As this is separated, it is seized between the finger and thumb by an assistant, and cut between the adnexa and the uterus. The tumour is now rapidly depressed towards the left; its anterior serous envelope is divided, if it offer any resistance, as far as its connections with the left broad ligament. Nothing now retains it save the other border of the latter, which a stroke of the scissors divides, and the uterus is free. As in the case of the right, the left broad ligament is seized by the fingers. In favourable cases, there is scarcely any bleeding, save some small jets from the uterine and utero-ovarian vessels occurring at the moment of the extraction of the uterus. This latter result is obtained by the section being carried so close to the uterine tissue that the main trunks of the vessels are not divided, but only their smaller internal branches. A few ligatures at each side are sufficient in the simpler cases to secure the uterine arteries and their principal branches. The right adnexa are now removed and resected by transfixion of the pedicle, which is tied circularly by a silk ligature. The left are treated in the same manner, and these ligatures are held by two hæmostatic forceps. The pelvic cavity is sponged, and cleansed of any blood remaining. The suture of silk which was placed posteriorly at the commencement of the operation is now drawn on, the vaginal mucous membrane is seized with one or two long-toothed forceps, and it is united by two or three sutures with the peritoneum. The ends of the ligatures tying the tubo-ovarian pedicles are now drawn into the vagina with a long curved forceps. The pelvic peritoneum has to be closed. The cul-de-sac of Douglas is sponged and dried, the pedicles of the adnexa at either side are covered, and, in effecting this closure of the peritoneum, care has to be taken not to wound the vessels. Should this occur, they are immediately tied. Doyen closes the entire pelvic peritoneum by a purse-string suture, taking in the posterior circumference of

the peritoneal wound, the adnexal pedicles, and the vesical peritoneum. It may also be closed in the usual manner by interrupted sutures. Any lateral tear is carefully repaired. The toilet of the pouch of Douglas is then terminated, the compress is placed in the pelvis at this point, and the table is replaced in the horizontal position. The abdominal wound is then closed. In certain cases, such as shortness of the broad ligaments, thickening of their upper border, with which is associated hypertrophy of the round ligaments, there is considerable resistance to the raising of the tumour through their attachments to the fundus. In such cases he divides the ligament, and temporarily secures it with hæmostatic forceps.*

In Doyen's latest *celio-pan-hysterectomy*, when the vagina has been opened in front and behind, and the cervix liberated from the bladder, the broad ligaments are seized and held by forceps, the pedicles are crushed, tied, and divided at either side, the uterine arteries are next tied, and the forceps are removed. A purse-string suture is carried from the retro-uterine peritoneum to that between the right adnexa and the bladder, this throwing the stump of the right adnexa below the peritoneum. The stump of the left adnexa is treated in a similar manner, and a continuous suture is carried from left to right, approximating the retro-uterine peritoneum to that of the bladder.

HYSTERECTOMY BY ANGIOTRIPSY.

Doyen, in 1897, at the Moscow Congress, introduced a new method of hæmostasis, effected by the crushing of a lever forceps.

He had before him, in the construction of his instrument, the chain écraseur of Chaissaignac. A careful study of hæmostasis had proved that the vessels which give rise to serious hæmorrhage are much less numerous than is generally supposed, and that the escape of blood is arrested almost immediately when the tumour has been completely detached and the wound is tamponned.

Furthermore, the hæmorrhage which occurs when operating on a tumour is almost exclusively venous and capillary. When these vessels have been compressed for any time the bleeding ceases, and only the arteries of a certain size, and the larger veins, especially those of the neck, require to be clamped or tied. Smaller arteries need only the application of the hæmostatic forceps in the course of

* See remarks on hæmostasis by angiotripsy for Doyen's more recent modification of this operation with his pressure lever forceps.



Delivery of a Fibromyoma with the Helicoid of Doyen. From a photograph. (By the kindness of Dr. Doyen.)



Abdominal Pan-hysterectomy. From a photograph. Cervix is half-detached, and the uterine arteries controlled by forcipressure. (By the kindness of Dr. Doyen.)

[*To face p.* 458.

PLATE XIV.



CERVIX ENTIRELY DETACHED. Ends of forceps seen on vagina. (From photo—Doyen.)



VAGINAL HYSTERECTOMY FOR MYOMA. Extraction of the fundus uteri after three V-shaped incisions. Cervix and posterior wall of uterus are seen at vulva. (From photo—Doyen.)

[*To face p.* 459.

an operation, these being left on until the application of the sutures.

[For my part, I think it safer, when a vessel has been secured in a Péan's forceps, to throw a light ligature of silk round it, and secure

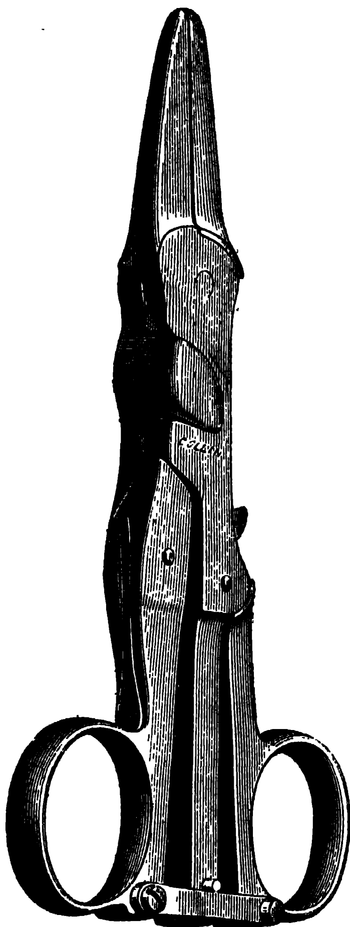


FIG. 362.—HÆMOSTATIC LEVER FORCEPS OF DOYEN, FOR GRADUATED PRESSURE.

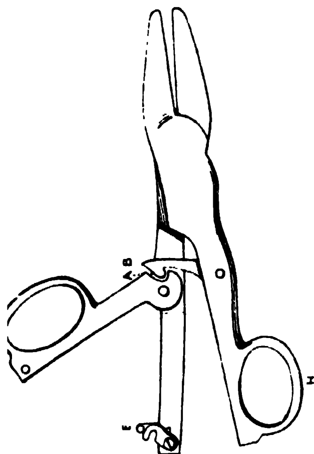


FIG. 363.—WITH LEVER RAISED TO EXERT PRESSURE.

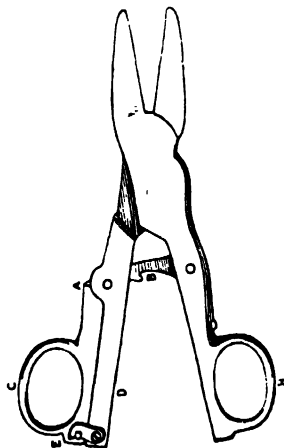


FIG. 364.—OPEN AS FORCEPS.

it there and then. To trust to the arrest of hæmorrhage by temporary or even comparatively long application of forceps is not safe, as has been repeatedly shown by the occurrence of secondary hæmorrhage when this method has been relied upon.]

Previous pressure forceps did not exceed a pressure of 200 kilogrammes, and this Doyen proved was ineffectual, failing to bring about that necessary crushing, not only of the intervening tissues, but also of the vessels. Doyen's short forceps yields a pressure, produced by the hand, of 560 kilogrammes at the extremity of the blades, and 1200 kilogrammes in the middle portion. Still this failed to crush the broad ligaments; but with his more powerful lever, a pressure, exerted with both hands, equal to about 100 kilogrammes, secures at the end of the forceps a force of 2000 kilogrammes and in the middle portion 4000 kilogrammes. With such an instrument it is possible to reduce the tissue seized between the teeth of the forceps to the thickness of a sheet of paper. Within from one to two minutes we obtain the maximum pressure, and the interposed tissues lose their water of constitution, and assume somewhat of a clear parchment-like appearance.

After a compression of from forty to sixty seconds the inferior third of the broad ligament may be cut or torn in the first stage of vaginal hysterectomy without any escape of blood. Towards the close of the operation the instrument is applied above the adnexa. Doyen thinks it imprudent, however, to cut the pedicle without placing a ligature or a small clamp forceps, as the peritoneal rent reascends into the pelvic cavity very high when the uterus has been detached. To permit any free bleeding surfaces in the peritoneal cavity is wrong; and in the same way if, in despite of the pressure, the torn ligament should, after the dressing of the wound with sterilized compresses, still show signs of bleeding, it is better to apply ligatures to the utero-ovarian vessels before placing the gauze tampon in the vagina. The final tampon should not be inserted under any circumstances until every trace of blood has disappeared.

Doyen points out that it is not safe to trust to compression alone in the case of certain pedicles.* (Emphasizing this advice, we do not advise pelvic section of the crushed pedicles without tying them, as secondary hæmorrhage often occurs in these cases, where the hæmostasis appears to have been amply sufficient.) However, the pressure forceps reduces considerably the necessity for ligatures, and the author of the method claims for it that hæmostasis is rendered far safer by the previous obliteration of the vessels.

Supra-vaginal Hysterectomy (the Method advocated by Howard Kelly).—The preliminary steps of the incision and delivery of the tumour

* See chapter on Vaginal Hysterectomy for angiotripsy in vaginal hysterectomy.

are the same as those already described. This may also be said of the ligation of the ovarian vessels and the management of the adnexa.

Kelly leaves both ovaries in a woman under forty, with the object of preventing the disagreeable symptoms of the artificially produced menopause. This, however, will depend upon the condition of the ovaries. Many consider that it is sufficient to leave one ovary, and this is the practice I follow.

The round ligament is tied separately. I prefer to place two ligatures, one nearer the uterus, and the other at the pelvic side, and divide the broad ligament between these. It is immaterial whether we use a sharp-curved needle, held with a convenient holder, or the blunt broad ligament needle. I prefer the latter for the broad ligaments. A short curved needle is the best to secure the uterine artery with. It is well, however, always to have at hand various sizes of the sharp needles, as well as those of Olshausen. Kelly next detaches the vesico-uterine peritoneum. An incision is carried from one round ligament to the other, and the bladder, having been raised, is freed from its connection with the uterus by being pushed down, either with a gauze-dab held in the holder, or, what is better, a piece of sponge. We thus bare the cervix as far as the vaginal junction, and the uterine vessels at either side come into view. The uterine artery is now felt for at the left side, and, with a sharp curved needle passed close to the uterus, it is securely ligated, together with the veins. If there be any doubt as regards the security of the ligature, it is well to draw the vessels out from the uterus, and place a second ligature upon them. The broad ligament at this side can now be divided, the scissors being made to skirt the margin of the uterus, not necessarily enclosing any of its tissue. Any remaining vessels that bleed are caught and rapidly ligatured. The uterus is now held up by an assistant, and tilted over towards the right side. But little blood should have been lost up to this part of the operation. The cervix is now divided a little above its junction with the vagina, and in doing so the uterine canal is exposed. This is covered by some folds of sterilized gauze, and the severance of the uterus is completed up to the exposure of the opposite uterine vessels, which are seen at the right border of the cervix, and a little distance from it. The uterus is now drawn up, so as to separate the cut surfaces, and thereby the vessels are more completely exposed. The uterine vessels first, the round ligament secondly, and the ovarian vessels last, on the right side,

are each secured with clamps, and when the broad ligament has been divided the tumour can be removed. The vessels, secured by forci-pressure, and the round ligament, are tied, the uterine artery being dealt with last. After careful wiping of the peritoneal surfaces, and examination of the pelvic cavity, so as to secure any remaining vessels that may require ligature, the cervical stump is now closed over the canal by passing catgut sutures antro-posteriorly, and tying these, not including in any of them the cervical canal.

Kelly does not now disinfect the cervical canal unless there are

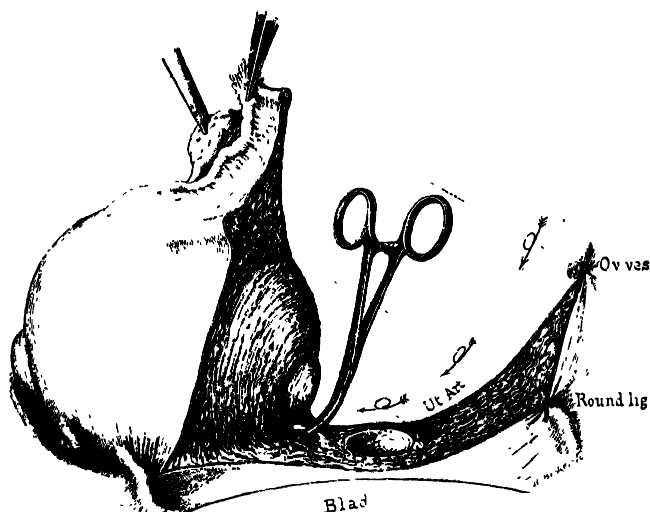


FIG. 365.—A CONTINUOUS INCISION FROM LEFT TO RIGHT, LIGATING OR CLAMPING, AT THE POINTS INDICATED BY THE ARROWS, THE LEFT OVARIAN VESSELS, THE ROUND LIGAMENT, THE LEFT UTERINE ARTERY. After section of the cervix, the uterus being drawn to the right side, the right uterine vessels are exposed and secured. (Howard Kelly.)

special reasons for doing so from the nature of its secretion. Should there be, the canal is wiped out with gauze and dissected round with a narrow knife. This being done, and all the exposed parts dry and clean, the anterior peritoneal flap is drawn forwards over the stump, and attached to the posterior peritoneum from side to side by continuous catgut suture. The ends of the round ligament and the ovarian pedicles are turned in between the peritoneal layers, and now the two layers of peritoneum are united together from side to side of the pelvis in a line running from one ovarian pedicle to the

opposite. Nothing remains but to complete the peritoneal toilet and close the abdominal wound.

This being Howard Kelly's special method of operation, it must be remembered that other operators proceed differently, and that we must be influenced by certain considerations. I recently removed by the supra-vaginal method a large fibromyoma, placing two double ligatures, first on the left side, and then on the right. The first included in a figure of 8 ligature the ovarian vessels and the round ligament. A second ligature was tied *en masse* a little to the outside of this, and the broad ligament divided between the two. The uterine artery and veins were next separately secured and divided. Another ligature *en masse* took in the lower third

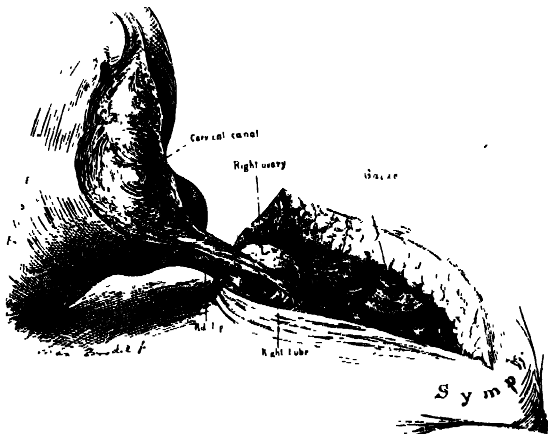


FIG. 366.—THE TUMOUR CONNECTED ONLY BY THE ROUND LIGAMENT AND RIGHT ADNEXA. (Howard Kelly.)

of the broad ligament, which was divided between the two. The same procedure was followed on the other side. The patient lost practically little blood, save that from the tumour itself in delivering it with a large vulsellum.

Noble thus admirably described the method of dealing with that very commonly met with complication, viz., the opening up of one or both broad ligaments by the tumour:—'In such a case the method of Kelly or that of Pryor can be adopted. The ligation is made in the usual way on the easy side. Then the ovarian vessels upon the involved side are secured. The relations of the upper border of the broad ligaments may be entirely distorted by the intra-ligamentous development of the tumour, but the vessels can be found and ligated without difficulty. When spread out over the tumour, they are



FIG. 367.—Each ovarian and each uterine artery has been ligatured by an isolated ligature as well as by a mass ligature.

The upper surface of the cervix has been sutured with interrupted catgut sutures. These sutures embrace the peritoneum of the posterior wall of the cervix, but not the anterior flap of peritoneum.

The closure of the peritoneal wound is indicated. The peritoneal wound is closed with a continuous Lembert catgut suture. The anterior flap is drawn over the wound like a hood or cap, and is fastened by a line of suture to the posterior face of broad ligaments and the posterior surface of the cervix. This renders the cervical stump retro-peritoneal. (C. Noble.)

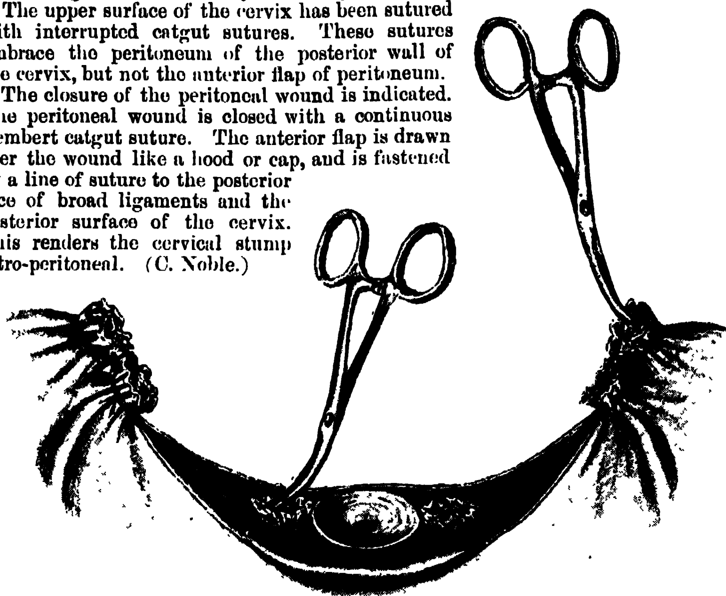


FIG. 368.—A mass ligature is shown embracing each ovarian artery, each round ligament and its vessels, and each uterine artery. The size of the stumps (mass included in each ligature) is exaggerated. The mass ligatures which secure the uterine vessels do not embrace the peritoneum. The artery forceps are shown drawing out one ovarian and one uterine artery or the isolated ligature of each vessel. The amputated cervix is shown with its surface slightly "cupped." The anterior flap of peritoneum is shown—peritoneum from the anterior face of the broad ligaments and vesical peritoneum. A posterior flap is not made. (C. Noble.)

best picked up (especially the veins) by passing a blunt aneurism needle under them. The round ligament may be widely separated from the ovarian vessels. A separate ligature is placed to secure the vessels of the round ligament. Clamps are placed to control reflux hæmorrhage. The round ligament is then cut through and the peritoneum in front of the tumour is incised, and the incision is carried across the front of the uterus to the opposite side. The bladder is then pushed down, and the peritoneum is pushed off the anterior face of the tumour. Careful search is made for the ureter, as in such cases it may run over the anterior face of the tumour. (He has never found it in this location.) The ovarian vessels are next divided, and the peritoneum is incised on the posterior face of the tumour. The tumour is then enucleated by making traction upon it with the hand or with vulsellum forceps, and by pushing the peritoneum and connective tissue off from the tumour with a sponge. At this stage all vessels have been secured except the uterine artery upon one side, and if the tumour is peeled out of its bed by pushing the connective tissue away with a sponge, no hæmorrhage results. After enucleation and delivery of the tumour, the uterine vessels upon the involved side can be ligated in the usual way."

'When both broad ligaments are distorted by intra-ligamentous development of the tumour or tumours, Noble has in some cases placed temporary ligatures internal to the ovaries upon both sides to control hæmorrhage from the ovarian arteries. "By placing clamps near the horns of the uterus to control reflux hæmorrhage, the upper border of the broad ligaments can be cut through, and the vessels of the round ligaments secured in the usual way, and the tumours enucleated by traction and pressure with a sponge as already described. After delivery of the tumours, ligation of the uterine vessels is simple. The cervix is then amputated and closed. Permanent ligatures are placed external to the ovaries and the appendages are removed. Finally, the peritoneal flap is sutured in the usual manner. This method is especially valuable when the tumour is impacted in the pelvis, and the appendages are densely adherent beneath the tumour." When using Kelly's method, Noble has usually made the first step of the operation the ligation of the ovarian artery upon the "involved side," otherwise following the directions laid down by Kelly.'

Baer's Supra-vaginal Method.

In Baer's operation, by transfixion, ligation, and cutting, assisted by the control of clamp forceps, the broad ligaments are severed at both sides from the tumour to a short distance from the cervix. The knife is then carried lightly around the tumour an inch or two above the peritoneal reflexion of the bladder in front and behind, and the peritoneum stripped off with a scalpel handle for the purpose of making peritoneal flaps. The next step is the ligation of the uterine arteries. This is accomplished by passing the ligature through the broad ligament, outside of, but close to, the cervix, avoiding the ureters. The uterus is then amputated, and the stump (trimmed and made as small as possible) immediately recedes upon being released, and is buried out of sight by the peritoneal flaps which cover it like elastic bands. The peritoneal flaps are united by Lembert sutures, if necessary. The cervix

is thus allowed to resume its natural position, and is devoid of a single ligature or suture in its tissues. Nothing whatever is done to the cervical canal. Nor has Baer found it necessary to use the temporary elastic ligature about the cervix.

Baer advocates this method, as it secures against hæmorrhage, because the bloodvessels are ligated outside the muscular tissue of the cervix; and against sloughing, because these tissues are entirely free from a contracting ligature.

It removes all of the supra-vaginal tissue, without opening the vagina, thus allowing the cervix to remain attached and *in situ*, to maintain its position as the keystone of the arch, and preserve the strength and anatomical shape of the lower part of the abdominal cavity.

The raw end of the stump is in contact with the raw surfaces of the surrounding structures, deep in the pelvis and covered by the raw edges of the peritoneal flaps, which press firmly upon these tissues, and immediate union doubtless occurs.

The danger of contamination from sloughing pedicle, open vagina, or drainage-tube, does not exist.

The anatomical relations of the parts are not so disturbed as in other operations, and the dangers of hernia, fistula, and other unpleasant sequelæ are absent.*

Complications in the Operation of Hystero-myomectomy.—Howard Kelly classifies the complications which have to be anticipated or dealt with in hystero-myomectomy thus:—

Those due to adhesions to, and affections of, the surrounding structures: those brought about by changes in the tumours themselves; those due to the position of the myomatous mass; those due to pregnancy, ascites, and other causes in particular.

The first class includes those affections of the ovaries and Fallopian tubes which are likely to cause adhesions of the omentum, parietes, rectum, sigmoid, colon, small intestines, vermiform appendix, liver, and suspensory ligament. It also includes diseased states of the ovaries, as well as diseases of the cervix and uterine mucosa, any of which may give rise to adhesion. As regards the changes in the tumours themselves, these include cysto-myoma, telangiectasis, suppurating myoma, and adeno-myoma. Amongst the principal complications due to the position of the tumour, are high displacement of the tubes and ovaries, filling and wedging of the pelvis, alteration in the position of the vesical and posterior pelvic peritoneum, broad ligament myoma, displacement of the ureters, and other unusual developments of the myomata in different directions. With regard to the third class, there is the myoma which

* *American Journal of Obstetrics*, Oct., 1892.

complicates pregnancy, and those cardiac nephritic and ascitic conditions that complicate myoma. Kelly advises that if there be an adherent sigmoid flexure with inflammatory and diseased conditions of the left tube and ovary, and that the latter are difficult to reach, either because they are sheltered by the tumour, or wedged down in the pelvis, and the adhesions dangerous to separate, being out of sight, to begin the enucleation by seeking out the ovarian vessels at the outer extremity of the broad ligament, and tying it at two points; then cutting between them, and tying off the round ligament in the same way. The top of the broad ligament is thus opened up, and the uterus can be lifted out so as to allow a free access to the inflamed structures. If pus be present, it must be carefully removed in the usual manner by protection of the parts and aspiration.



Fig. 369.—Necrosed mass, which, with ligatures, was passed through the os uteri after supra-vaginal hysterectomy on the twenty-fourth day, leaving the vaginal vault perfect. There had been an offensive vaginal discharge, but no constitutional symptoms whatever. It came away when the vagina was being douched at night. This patient made a perfect recovery. (Natural size.)

Adnexal complications on the right side, he advises to be dealt with after enucleation.

Omental, parietal, and intestinal adhesions have to be treated in the ordinary manner by careful detachment and ligature. It may happen that the adhesions of the intestines are so numerous and firm as to defy separation.

If the vermiform appendix be adherent, and the adhesion slight, it may be peeled off; but if it be dense, with evidence of past or co-existing appendicitis, Kelly cuts the tumour across the cervix, having freed it on the left side, clamps the right uterine artery, rolls the tumour out, and having secured the right round ligament and ovarian vessels, clamps off the appendix near the colon, and leaves it attached to the tumour, subsequently dealing with its stump.

If there be tumours of the ovary complicating the myomata,

these must be dealt with according to the individual peculiarities of the case, the ovarian tumour and fibroma being removed together.

Should cancer of the cervix be present, or malignant conditions, such as adeno-carcinoma, of either the cervix or body, it is better to perform pan-hysterectomy.

If the tumour be fibro-cystic, and there be much fluid in the cyst, this may be tapped, and the operation then proceeded with.

With regard to those most serious of all the complications the surgeon has to deal with in the removal of myomata, viz., unusual and dangerous developments, either with reference to the space occupied in the pelvis, or the relations of the tumour to the peritoneum and the pelvic viscera, the management of all such must depend upon the exact condition met with at the time. The lines of procedure in various cases will be influenced by (*a*) the difficulty in delivery of the tumour; (*b*) the freeing of adhesions; (*c*) the position of the bladder with regard to the tumour; (*d*) the involvement and displacement or division of the broad ligaments and the adnexa; (*e*) the pelvic attachments, and the firmness of adhesions and degree of impaction of the mass; (*f*) the displacement of the ureters, or the presence of adhesions which either surround them or bring them into close relation to the uterine arteries or branches of these vessels; (*g*) the relation of the tumour to the sigmoid or rectum, and the presence of adhesions uniting the tumour to the bowel.

Comparison of Supra-vaginal Hysterectomy and Pan-Hysterectomy.

Some statistics of Charles Noble's, as showing the results relatively of supra-vaginal amputation for myo-fibroma, and total extirpation of the uterus, are of interest. In 345 cases operated upon by Kelly, Baldy, Penrose, Boldt, and Charles Noble, in America, the mortality was 4·9 per cent. in the supra-vaginal operation, and in 806 cases collected by I. Olshausen (F. N. Veit's 'Handbuch de Gynacologie,' 1897), the mortality was 5·6 per cent., whereas in 100 cases of total hysterectomy reported by Polk and Boldt, the mortality was 10 per cent., and in 520 cases collected by Olshausen, the mortality was 9·6 per cent. This clearly establishes, so far as statistics are concerned, the relative risk of the two operations; but it is well to remember that in cases of total hysterectomy the graver operation is absolutely necessitated either by pelvic complication in the tumour itself, and arising out of its position in the pelvis, or extra-uterine pelvic disease. Also, it has to be confessed, that the supra-vaginal procedure is simpler and requires less experience and technical skill than total hysterectomy. We are not, however, deciding on the question merely of the relative difficulty, risk, or mortality of two procedures. We

have also to take into consideration the relative advantages to the patient as between an incomplete and a complete removal of the organ. Noble, writing on the subject, says: 'Hysterectomy is longer in its performance, hæmostasis less satisfactory; there are the consequences of opening the vagina, and the greater risks of a granulating wound and various sources of septic absorption. The advantage that the supra-vaginal operation offers of dispensing with drainage is one of the strongest points in its favour. Not but that we consider it is unwise, in cases where we have had to deal with pus tubes and other sources of infection, to deliberately abandon drainage.'

Noble, as indeed are the leading gynæcologists of America, is opposed to vaginal hysterectomy for fibroma of any size. If they are so small as to favour removal by the vaginal route, myomectomy is the operation of election, and the objections of clamp or ligature in causing sloughing, with the need for drainage, are to him unsurgical procedures that condemn the method.

Electro-Hæmostasis as a Substitute for Ligature or Forci-pressure.

Jacobs, of Brussels, in the *Revue de Gynæcologie*, July-August, 1899, advocates, in lieu of ligature, clamp, forci-pressure, or the lever *pince* of Doyen, the method of *angiotripsie* or forci-pressure introduced by Skene, of Brooklyn, in which pressure by heat is utilized by a special forceps or clamp heated by electricity. Jacobs says that it offers these special advantages: the tissues do not slough, and it enables us to act on a large surface, including the tissues that separate the vessels. He rightly credits Skene, of

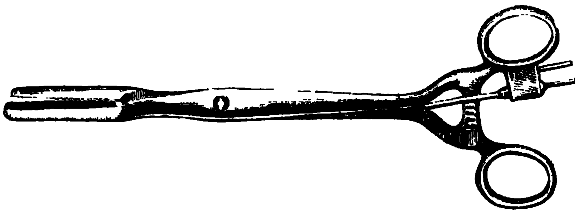


FIG. 370.—ELECTRO-HÆMOSTATIC CLAMP FORCEPS.

Brooklyn, with the realization of the principle that hæmorrhage can be controlled by the modern method of securing the vessels as they emerge from the pedicles under the peritoneum by means of electrical hæmostasis.

The instrument employed is an ordinary forci-pressure forceps, one of the branches of which has its blade hollowed so that the interior of this small cavity contains a platinum wire completely isolated by incombustible material. One end of the wire is joined to the blade itself, while the other is attached to an isolated copper wire which extends for the length of the forceps to its handle, where there is a small block of metal. In this the copper wire

is isolated, and, passing through it, ends at a few centimetres from it. Another short copper wire is attached to the block close to the handle. The instrument can be thoroughly sterilized and then used like any other forcipressure forceps. The electric current passing through the copper wire heats the platinum in the forceps blade. The electricity can be obtained in

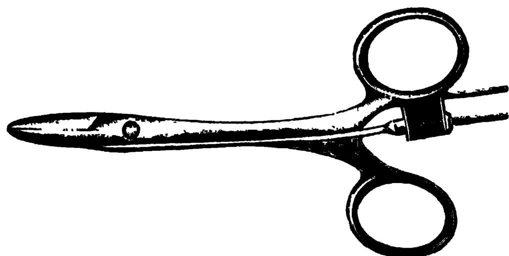


Fig. 371.—Electro-Hæmostatic Forceps.

the usual manner from the ordinary main, and a rheostat may be interposed so as to regulate the strength of the current according to the size of the instrument and the end there is in view. A flexible cable enables us to apply the instrument at a distance from the electrical source, and it is so isolated and jointed that the termination of its wires is directly continuous with those of

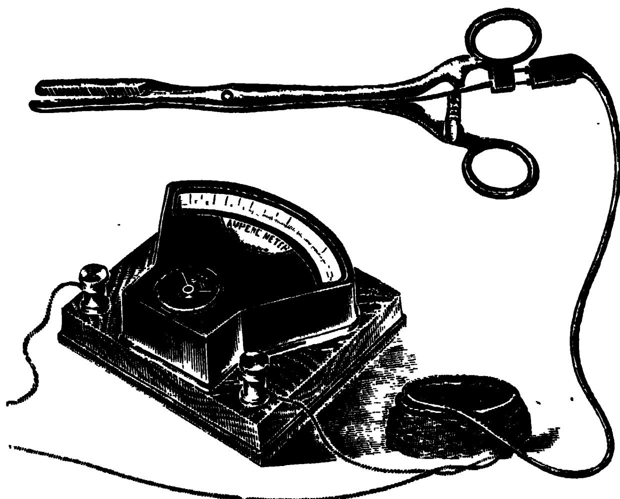


Fig. 372.—Battery, Galvanometer, Coil, and Electro-Hæmostatic Forceps.

the instrument. The idea of this method is to compress between the blades of the forceps a part of the tissues adjacent to the end of a vessel, expel as much blood as possible, and then secure complete desiccation by the heat developed in the forceps. The necessary temperature is from 80° to 90° Fahr., a heat which neither bruises nor chars the tissues. The instrument can be

sterilized along with the others necessary for an operation. When applying it a little sterilized vaseline should be smeared along the blades of the forceps, so as to prevent adhesion of the tissues. The end of the cable can be sterilized in boiling water and then wrapped in a compress of sterilized gauze. In applying the forceps the tissue immediately joining the vessel is isolated so as to avoid the effects of radiation, connections are now completed, and the current is passed.

Fig. 372 shows the battery and the attachment of the cable to the forceps. A galvanometer should be interposed so as to judge the strength of the current and the time necessary to produce the desiccation. This being effected, the current is closed by removing the cable, and the tissue which extends beyond the blades of the forceps is cut. The forceps is now opened cautiously so as not to tear the tissues. The time necessary for the desiccation is from a half to two minutes.

Looking at the calibre of the vessel which has thus been compressed, it has a flattened appearance somewhat resembling parchment, and the compressed tunic becomes translucent. The dried portion, after it has been well soaked in water, remains firm and unbroken, and any dissection of the component parts of its tunics is impossible, nor can we recognize its various elementary structures with the microscope. The adjacent tissues undergo the same changes. The lumen of the vessel is with difficulty determined. Identical results follow the application of the instrument to the vermiform appendix, nor can any trace of the mucous elements be found.

We have another good example of the effects of this form of hæmostasis in its application to the pedicle of an ovarian cystoma, and this has to be remembered, that where such a result is desirable it produces an occlusion of the lymphatics, and thus opposes an obstacle to the spread of infection; further, so contracted is the surface of the divided pedicle that it does not offer any bleeding surface calculated to contract adhesion with surrounding structures. In those cases in which the friability of the tissues renders the application of a ligament difficult and risky, electro-hæmostasis is complete and safe. Thus we see the advantages which are claimed for this method of preventing hæmorrhage. It is clean and rapid in its action, permanent in its effects, and disinfectant, preventing the spread of infection while lessening the risk of inflammatory adhesions. During ovariotomy and hysterectomy, if there be omental or intestinal adhesions, these may be destroyed by a quick application of the forceps, and the bleeding of small vessels controlled. A special protective forceps is used by Skene, in the instance of intestinal adhesions, to protect the coils of intestine. The applicability of this method to the pedicle of an ovarian cystoma is obvious. In abdominal total hysterectomy the ordinary hæmostatic forceps are quickly replaced by the electrical forceps, also the round ligament is secured. A minute and a half or two minutes is sufficient for the ovarian or uterine arteries, and one minute for the round ligament. The desiccated pedicles are covered by the peritoneum by means of a catgut suture. In salpingo-oöphorectomy the same plan is pursued, the hæmostatic forceps being replaced by the electrical.

Jacobs, with six abdominal hysterectomies, and two ovariotomies

FIG. 373.—APPLIED TO OVARIAN CYSTOMA.



FIG. 374.—ELECTRO-HÆMOSTASIS APPLIED TO ROUND LIGAMENT.

for a large cystoma with twisted pedicle, had no accident, and Skene, with more than 200 abdominal operations of different kinds, had no hæmorrhage. Jacobs cites a case in which he resected a large portion of the omentum, and instead of ligaturing he used the electrical forceps, with perfect control of all hæmorrhage. He argues that, even if an operation be slightly prolonged beyond the

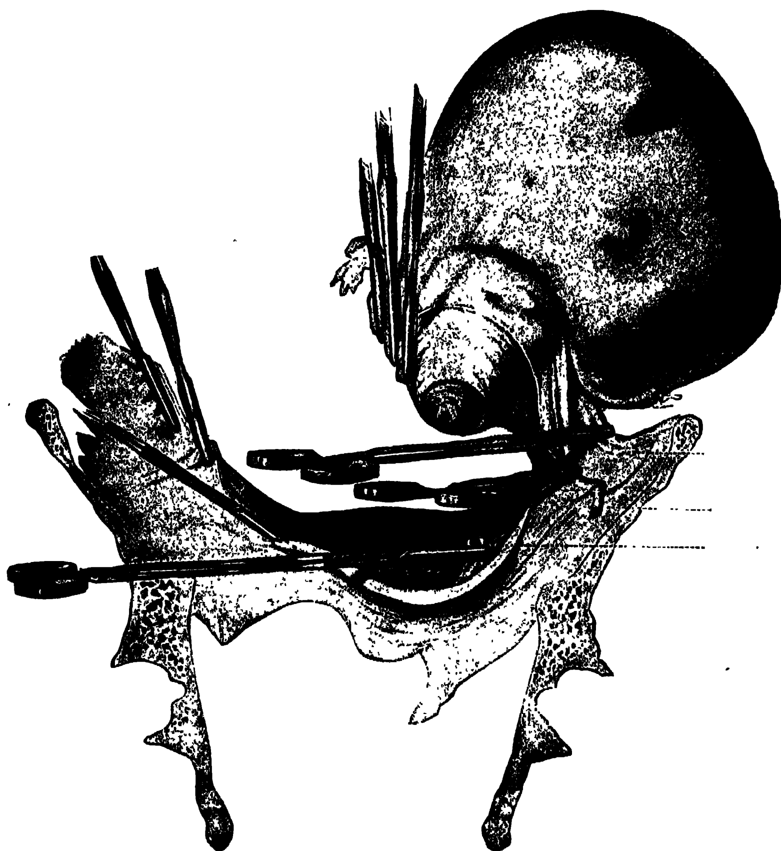


FIG. 375.—ELECTRO-HÆMOSTASIS IN PAN-HYSTERECTOMY.

time occupied by the simple ligatures, the delay is compensated for by the advantages offered by the method. In appendisectomy, in a minute and a half to two minutes, the application of the forceps allows of section of the tissues on a level with the instrumental construction. 'There is no necessity to place sutures of any kind, nor to refold the pedicle of the appendix under the peritoneum.' The

intestinal mucous membrane is united, and the canal of the appendix is closed. There need be no apprehension in returning the cæcum into the abdomen. These advantages are claimed for the use of electro-hæmostasis over the ligature in removal of the appendix. The organ is divided without the escape of its contents on the adjacent surfaces, also without risk of perforation or abscess of the wall of the cæcum from the invagination of an infected



FIG. 376.—ELECTRO-HÆMOSTASIS IN PAN-HYSTERECTOMY.

pedicle, and the extension of the infection into the pedicle between the ligature and the incised end.

In vaginal hysterectomy the forceps used are longer than those employed in abdominal hysterectomy, so as to enable the surgeon to obtain greater security. Further than the substitution of the electrical for the ordinary forceps, there is nothing exceptional in the operation.

CHAPTER XXIV.

SURGICAL TREATMENT OF UTERINE FIBROMYOMATA (continued).

Other Operative Procedures for the Removal of Uterine Fibroids.

Enucleation.

Vaginal Enucleation.—The operation by enucleation is not in much favour in England. It is more specially adapted for submucous fibroids which protrude rather in the direction of the cavity than towards the peritoneal surface of the uterus, being embedded in the muscular stroma. Schroeder considered that enucleation was justifiable under these circumstances, even when the tumour had attained to the size of the head of the fœtus at full term.

The step of *morcellement* has been added to that of enucleation, to further facilitate the removal of the mass per vaginam in cases in which it is not possible to shell it out and deliver it in its entirety. Obviously, the character of the operation must vary according to the size and depth of the tumour. The patient is prepared as for vaginal hysterectomy, and the vagina is packed previously with antiseptic gauze. The uterus is pushed down by an assistant, while another irrigates the vagina thoroughly, which is well opened by retractors. It is necessary to have at least three assistants during the operation.

The steps of the vaginal operation consist of (*a*) preliminary dilatation of the uterine neck, or its incision as far as the vaginal attachment, having first ligatured the lower branches of the uterine vessels. (See 'Ligation of the Uterine Arteries,' p. 434.)

(*b*) The second step consists in the complete depression of the tumour by strong fixing forceps, and the opening of the capsule. This is done with scissors, bistoury, or with the nail of the operator. (*c*) The third step consists in the separation of the tumour with the

finger, spatula, or the enucleator of Sims, assisted possibly by the scissors. After this (*d*) the tumour is extracted, as is done in the case of a polypus. The gaping wound is trimmed of any torn portions of mucous membrane which remain, and is thoroughly irrigated with hot water. Finally, it is tamponned with sterilized iodoform gauze, and a subcutaneous injection of ergotine is given to promote uterine contraction.

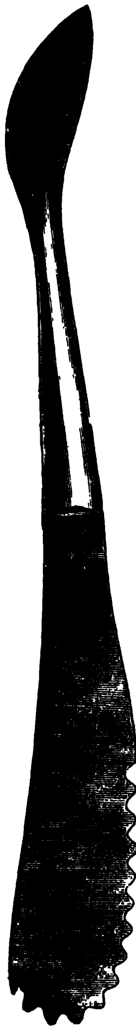


FIG 377.—ENUCLEATOR FOR SHELLING OUT THE TUMOUR. The serrated end is the latest suggestion of Kelly.

The dangers of the operation are hæmorrhage, perforation of the uterine wall, possible inversion of the uterus during traction, embolism, thrombosis, peritonitis, and septicæmia. It may be necessary to divide the vaginal wall posteriorly, as well as the uterus, and occasionally also the anterior cul-de-sac. This applies rather to tumours developed in the pelvic cellular tissue than to subperitoneal growths of the uterus.

Enucleation by Cœliotomy of Interstitial Myomata.—Spencer Wells was one of the first operators who performed this operation. Subsequently A. Martin, Spiegelberg, and others, largely practised it.

If the operation of enucleation be performed by cœliotomy, a temporary elastic ligature or the rope of Tait is carried round the body of the uterus, below the growth, which is then opened through its capsule. A V-shaped or circular incision is made over the most prominent portion of the tumour, which is then enucleated. The peritoneal flaps are trimmed for accurate adaptation, buried sutures are placed from below upwards, approximating the uterine tissues, and, finally, the peritoneal surfaces are united by interrupted sutures. If the uterine cavity be opened, the mucous membrane is sutured separately. Drainage is maintained by the vagina (Martin), or by the abdominal wound (Hégar). Under all circumstances the most careful aseptic precautions have to be taken.

Enucleation by Cœliotomy.—William Alexander thus summarizes the indications for enucleation :—

'(*a*) Those producing any serious signs or symptoms of disease, crippling the patient, and interfering with marriage, pregnancy, or happiness.

'(*b*) When such tumours are solitary, or not exceeding three or four in number, and all are capable of being removed through one incision into the fundis uteri.

'(*c*) When the uterus and appendages are sufficiently healthy to perform their functions, enucleation should, if possible, be performed.

'(*d*) The size of the tumour or tumours does not signify, provided that a healthy uterus can be left behind.'

He thus summarizes the advantages of enucleation over hysterectomy in suitable cases.

'1. It is not a deprivative operation, and hence it can be performed earlier when patients are only crippled or worried by the disease, and before dangerous symptoms set in.

'2. The shock of operation and risks to the patient in these early enucleations are much less than in hysterectomy later on. No mortality has occurred in my practice when less than five tumours have been removed (nineteen cases).

'3. Marriage, pregnancy, and parturition are possible, if not probable, and relief will be accepted by patients in this way who would continue to suffer rather than have hysterectomy performed, or their ovaries removed.'

The chief points in Alexander's operation of enucleation are—

1. The enucleation of all the tumours through one longitudinal opening in the fundus uteri.

2. Packing the cavities whence the tumours have been removed with aseptic or antiseptic gauze, and stitching up the wound in the uterus with catgut sutures, leaving the end of the one long strip of gauze to emerge from the lower end of the uterine wound, and to reach the surface of the abdomen through the lower angle of the cœliotomy wound.

3. Fixing the uterus temporarily to the abdominal wall by a single silkworm-gut suture tied on the surface of the abdomen.

Hæmorrhage is prevented and drainage is secured by the gauze, and oozing from the uterine wound is arrested by the pressure of the uterus against the parietal peritoneum.

The packing is removed at the end of forty-eight hours, and the silkworm-gut suture at the end of fourteen days.

Should the uterine cavity be opened, it must be drained by a glass tube from below.

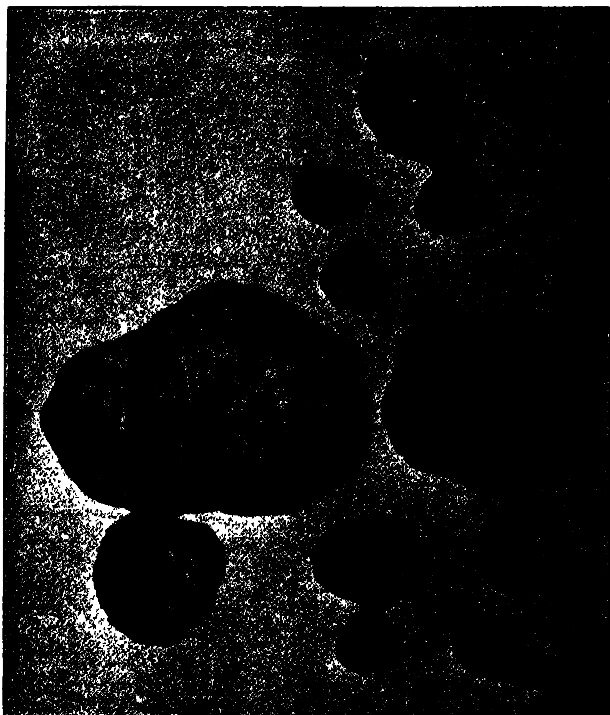


FIG. 378.—FIBROMYOMATA SUCCESSFULLY REMOVED FROM A PATIENT BY ALEXANDER, BY HIS OPERATION.

Indications for Myomectomy.—Howard Kelly says that myomectomy should always be preferred to hystero-myomectomy in a young woman, when no complications exist to interfere with the operation, and where the uterus is not larger than a six months' pregnancy. Otherwise, he says, 'myomectomy must always be the operation of election;' and he thus classifies categorically the cases suitable for abdominal myomectomy: (1) Pedunculate myomata, after the removal of which we can preserve a normal uterus. (2) All interstitial or subserous myomata which are well defined in relation to the body of the uterus, whether single or multiple. (3) Multiple

small myomata. (4) Broad ligament myomata. (5) A myoma localized at one cornu of the uterus. (6) A submucous myoma too large to be taken out by the vagina.

The decision as to the suitability of the tumour for myomectomy will depend on the care with which the following points are determined beforehand: (1) The presence of a well-defined pedicle. (2) The definition of well-defined tumours of various sizes in the uterine wall. (3) The recognition of an intra-mural fibroid in the anterior or posterior wall of the uterus, while the uterus itself is

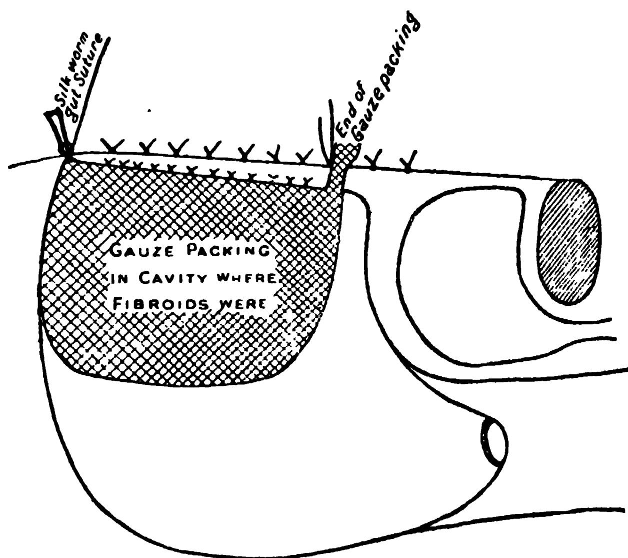


FIG. 379.—DIAGRAMMATIC, SHOWING THE CAVITY FITTED WITH GAUZE, THE DRAIN, AND THE SUTURES. (Alexander.)

not much enlarged, as determined by the uterine sound. (4) The determination of the absence of serious pelvic complications.

Ligation of the uterine arteries may be called for, and clamps and the temporary rope or elastic ligature should be at hand. Kelly advises that the hands of the assistants should be protected by sterilized gloves, in those cases of interstitial myomata in which much handling is likely to be required. He emphasizes the danger of septicæmia in these cases, more so than in myo-hysterectomy. Eight myomata were removed from a uterus successfully, without exposing the uterine cavity. Catgut is the material he uses for

the interrupted ligatures in closing the cavities. The abdomen is closed without a drainage tube, and he lays particular stress on the necessity for arrest of the hæmorrhage by interrupted or mattress sutures applied from the bottom of the wound to the peritoneal surface to the areas most affected.

Salpingo-Oöphorectomy for Fibroid Tumours.

The indications for removal of the uterine appendages and the details of the operation for disease of the adnexa will be referred to when dealing with affections of the Fallopian tube and ovary. (See chapter on Affections of the Fallopian Tubes and Ovaries.)

I take this opportunity of objecting to the careless use of the term 'castration.' In the case of fibroid tumours, the organs that are removed may be healthy, for the operation is performed to bring about the premature change of life. Yet even in this instance I think it preferable to adhere to the term 'oöphorectomy,' in which the ovary alone, or 'salpingo-oöphorectomy,' in which both ovary and tube, are removed. In all other cases in which we advise removal of the appendages, we do so for diseased conditions which either directly or indirectly affect the health or threaten the life of the woman. In the instance of fibroids, the removal of the appendages is undertaken for conditions which would, in the vast majority of those who suffer from them, render conception impossible. In most of the cases there are pathological conditions of the appendages associated with these growths. The term 'castration' being allied in the public mind with the deliberate mutilation of the healthy organs of generation for the sole purpose of unsexing the man or animal on whom it is performed, the use of it in describing what is in its ultimate aim and object a truly conservative step for the arrest of pain or hæmorrhage and the cure or arrest of disease, is misleading. Also it can be thus turned to prejudice an operative step, which is, when rightly taken, a most valuable gynæcological procedure, and *does* so tend to bias when the term is carelessly or cynically applied.

It is well and interesting to recall Battey's statement to the American Congress of 1881 with regard to oöphorectomy for growing or bleeding fibroids :—

'Perhaps no safer rule can be laid down to-day by which one may determine in any given case the propriety of the operation, than by asking himself three questions, namely—1. Is this a grave case? 2. Is it incurable by any of the resources of the art short of the change of life? 3. Is it curable by the change of life? If all three of these questions can be answered affirmatively, the case is a proper one; but if not, the operation is not to be justified.'

Since then, and more especially of late, very different views have

been held by leading gynæcologists on the value of oöphorectomy and salpingo-oöphorectomy for bleeding fibroids.

It is difficult to define the exact character of uterine growth which it is right to treat surgically by removal of the appendages. This arises from the fact that the two principal indications for the operation, viz. rapidity of growth and hæmorrhage, have associated with them in different women such widely-varying conditions, both touching the tumour itself and the patient's health and circumstances, that no rule can be laid down. The involvement of other organs than the uterus, the nature of the tumour itself, and the symptoms directly dependent upon it, arising from its size or pressure, the patient's age, and the possibility of pregnancy, are among the most prominent facts which must influence our decision. In favour of the operation is the diminution of risk, and the large proportion of cures. Against it are the facts that in a given number of cases bleeding continues, and, in a certain proportion, that myomata grow more rapidly after the operation. While such ardent gynæcologists as A. Martin object to it, other Continental authorities, as Olshausen, Schauta, Doyen, and Leopold, advocate it in appropriate cases. We may add that British and American gynæcologists generally still perform the operation in specially selected cases, and the persistence of hæmorrhage in many cases after operation is doubtless due to the fact that at one side it has been found impossible to completely remove the ovary and tube. We may thus epitomize the indications and contra-indications of the operation :—

Indications.

(*a*) Small tumours under the size of the fœtal head.
(*b*) Rapidly-growing tumours in women under thirty.
(*c*) Small interstitial fibroids.
(*d*) Intra-ligamentary fibroids in the early stages of their growth.
(*e*) When the patient refuses to undergo hysterectomy, but is willing to submit to salpingo-oöphorectomy.
(*f*) Hæmorrhages not yielding to other therapeutic measures, and threatening the general health or life of the patient.

Contra-Indications.

(*a*) Inaccessible ovaries and tubes.
(*b*) Cystic fibroids.
(*c*) Pedunculated growths.
(*d*) Large tumours.

On these indications and contra-indications there is a general concensus of opinion on the part of British gynæcologists.

The results of the operation show that in eighty to ninety-five per cent. of the cases the menopause is brought about, and that in at least ninety per cent. of *thoroughly completed operations* shrinking in varying degrees occurs, while the general health of the patient is improved. It must be borne in mind that in a large proportion of patients suffering from fibroid tumour of the uterus there are pathological conditions of the ovaries and tubes associated with it.

Furneaux Jordan, in an interesting paper recently read before the British Gynæcological Society, recorded 58 cases of salpingo-oöphorectomy, performed on patients whose ages varied from 21 to 49. For pyosalpinx or tubo-ovarian abscess, 20 cases with 3 deaths; salpingo-oöphoritis, 13 cases with 0 deaths; double hydrosalpinx, 1 case with 0 deaths; cystoma of both ovaries, 7 cases with 0 deaths; myoma of uterus, 17 cases with 1 death.

'In the cases that recovered from the operation the final result has on the whole been good. The severity of the suffering from the artificial menopause has varied very considerably, and chiefly in proportion to the age of the patient. The younger the patient the greater the suffering. The difference in the severity of the symptoms between cases of salpingo-oöphorectomy and hysterectomy is no more than would be expected from the difference in the ages of the patients.

'With two exceptions, the effect of salpingo-oöphorectomy upon the myoma of the uterus has been most beneficial. In twelve cases the tumour has, as far as I can tell, disappeared. In two cases it has already diminished considerably, and will, I doubt not, diminish further in the future. The two exceptions were cases that required a subsequent hysterectomy for their cure.'

Morcellement.—Emmet was the first who performed both enucleation and morcellement, but it is Péan's name that is mainly associated with the latter step. I cannot say that it is one which finds many advocates in this country. Péan himself had occasionally to abandon the attempt of thus removing the tumour piece by piece, and had finally to resort to total hysterectomy. These, briefly, are the details of the operation:—

The patient having been placed in a suitable position, the same steps are taken as in the operation for enucleation. The uterine neck is seized with a strong vulsellum forceps, and drawn down. A circular incision is carried round the vaginal attachment, and the bleeding points are secured by pressure forceps. The uterine neck is then freed, the peritoneum, bladder, and ureters being carefully avoided. When the tumour to be removed is of considerable size, the next step should be the ligation of the uterine arteries. The cervix is next divided by scissors into two halves

by incisions reaching to the fibroid tumour, and each half is held aside by a strong-toothed fixing forceps, or a V-shaped flap is made

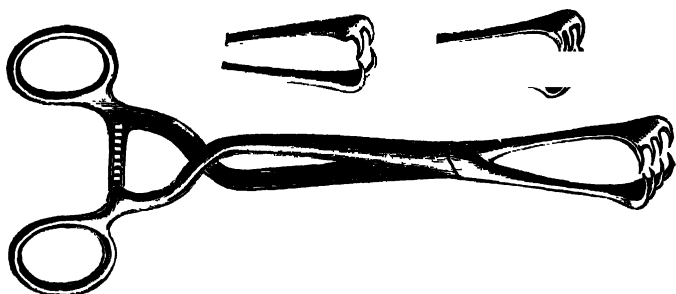


FIG. 380.—FORCEPS FOR GRASPING THE TUMOUR IN MORCELLEMENT.

and the tumour is thus exposed. It is then as far as possible examined by the finger, the uterus being drawn well down for the

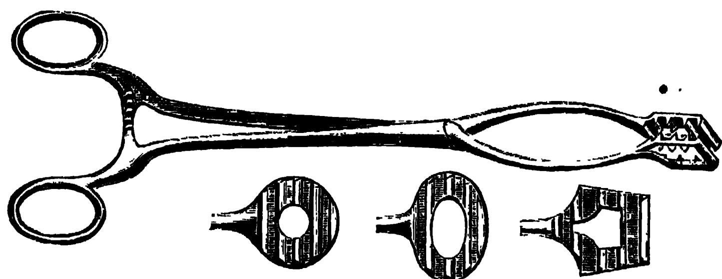
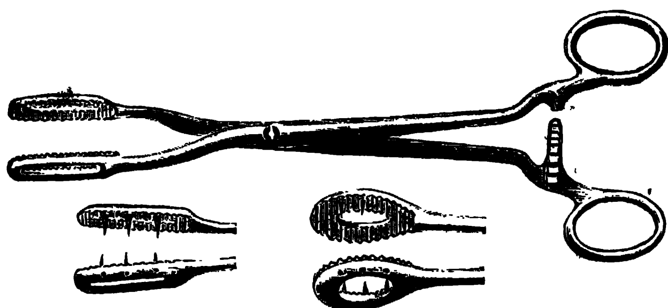


FIG. 381.—MORCELLEMENT FORCEPS.

purpose. The vaginal walls are held widely apart by retractors, and smaller ones are introduced inside the uterus, and with such



FIGS. 382.—PÉAN'S CYST FORCEPS, USED IN MORCELLEMENT.

forceps as those shown (Figs. 380–382), the tumour is grasped, and a deep longitudinal incision is made into it. Then portion after

portion is seized with somewhat similar forceps, and a curved scissors being carried under it, the piece thus caught by it is excised.

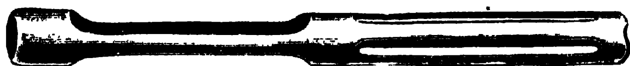


FIG. 383.—DOYEN'S TUBE TRANCHANT.

Two or more forceps are used, and a second portion of the growth is caught before that first seized is removed. The bistoury has a short, broad, and strong blade.

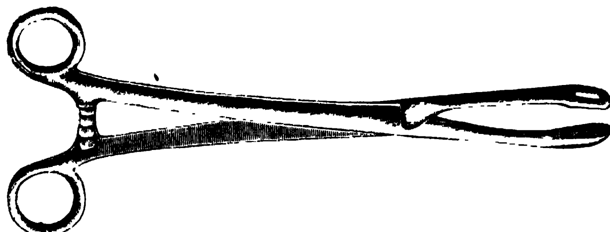


FIG. 384 FORCEPS USED WITH THE TUBE TRANCHANT.

Some tumours bleed more readily than others, rendering the successive removal of each portion more difficult than in the case of bloodless fibroids.

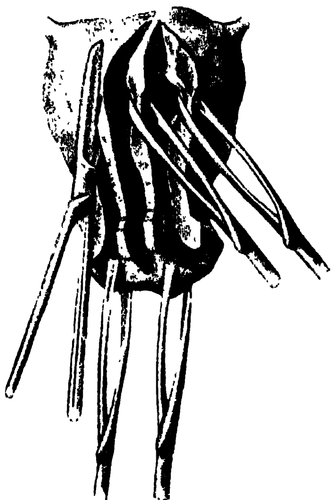


FIG. 385.—MORCELLATION OF ANTERIOR WALL OF UTERUS IN STRIPS.

Should other small myomata be found in the neighbourhood of the larger mass, these and any fibromatous nuclei should be removed by enucleation or morcellement. Hæmostatic forceps are freely availed of in cases where there is much bleeding. The operator has a large number of compressed sponges or gauze tampons on holders ready to hand, to staunch the blood and enable him to see the bleeding points. All clots are removed. Forcipressure and sponging are assisted by hot irrigation. In some cases, where the mass removed is very large

and the bleeding difficult to restrain, forceps are allowed to remain on from thirty-six to forty-eight hours after the operation, tampons of iodoform gauze being packed in between. Otherwise it is sufficient to suture the wounds in the uterine neck.

Morcellement of a large fibroma may also be practised thus: A large V-shaped mass, the base of the V reaching to a short distance



FIG. 386.—MORCELLATION FOR SUBMUCOUS FIBROMA—V-SHAPED FLAP RAISED ON ANTERIOR WALL. (Doyen.)

beneath the broad ligaments, or level with these, is seized in a strong claw-forceps by its apex, and held firmly while successive lozenge-shaped masses are seized with the forceps, and cut away until the entire triangular mass is removed. In this manner the bulk of the tumour is so reduced that, when it is seized transversely, it can be drawn down to the vulva. Introduction of the finger may be feasible between the tumour and the uterine covering, and it may be in this manner detached from its cellular bed.

Submucous Fibromata.

In the case of large intra-uterine submucous fibromata, and also in certain interstitial ones, morcellement is practised thus: The uterus is incised along its anterior wall with a V-shaped incision, and the flap thus formed is raised over the tumour, the lower part of which is thus exposed; or the section is made in the form of a Y, the stem reaching to the os uteri, and the two branches

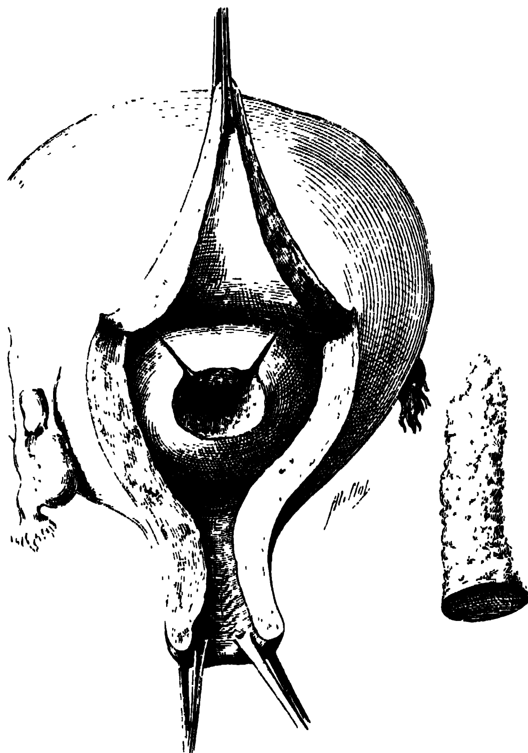


FIG. 387.—V-SHAPED FLAP RAISED, AND THE PORTION REMOVED BY THE DRILL SHOWN.

extending laterally in the direction of the broad ligaments. The *tube tranchant* of Doyen (Fig. 383) is here of special use, as it drills a large tunnel through the substance of the uterus; or, again, the wall of the tumour is incised in lozenge-shaped pieces, and these are removed portion by portion over the hollowed-out space bored by the sharp drill. The portions thus cut out are removed, and the now friable fibroma is extracted in fragments by morcellement

forceps. The more friable tumours are more readily removed. The nature of the morcellement, and the technique of the operation, must depend upon the size of the fibroma and its consistence. The primary step in these cases is always careful separation of the bladder and detachment of the peritoneum, with the ligature, whenever necessary, of the uterine vessels. When the fibroma has been enucleated, the incision on its anterior wall is closed with catgut suture, and the cavity is tamponned temporarily with sterilized iodoform gauze, or ordinary sterilized gauze wet with

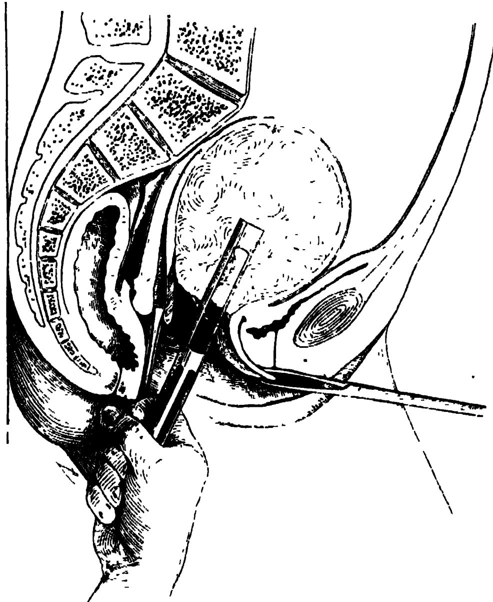


FIG. 388.—APPLICATION OF THE 'TUBE TRANCHANT' OR DRILL OF DOYEN TO THE TUMOUR.

carbolic acid solution. This tampon is removed on the second day, and intra-uterine and vaginal douches are given. The douches are repeated frequently, five or six times in the twenty-four hours, and the temperature is carefully watched.

Myomectomy for a Pedunculated Fibroma, the Uterine Cavity not being opened.—A temporary elastic ligature, or the rope of Tait, is placed as low as possible on the uterus. When the tumour is delivered, the treatment of the pedicle will depend upon its size. If it be small or slight, it may be treated by ligature, but if of

a larger size and thick, it is compressed by a powerful clamp-forceps, and the tumour is cut at a sufficient distance so as to peel off the peritoneum and fashion the stump, which is carefully covered by it. This is done with silk suture. When all bleeding is stayed by means of forceps or ligature of the separate points, the pedicle is returned into the abdomen.

Fibromata of the Broad Ligaments—Decortication.—The tumour may protrude by a comparatively small pedicle into the peritoneal cavity, or, on the contrary, its base of attachment may be thick, and the greater portion of the tumour remain in the true pelvis. In the former case it may be possible to remove it after application of the temporary elastic ligature. Should this not be so, the

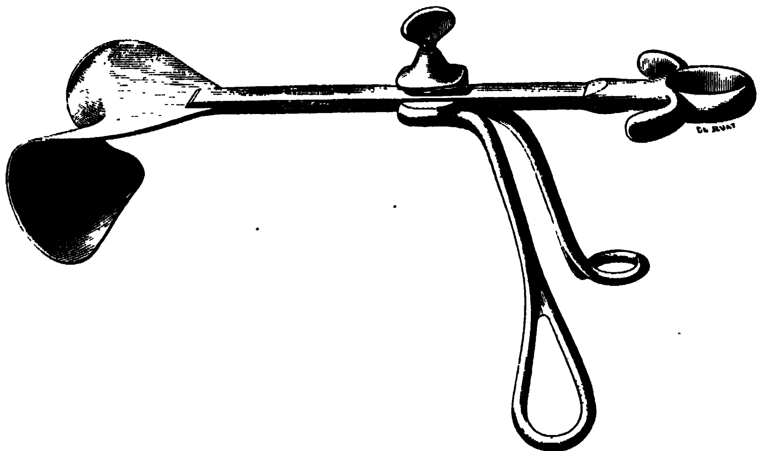


FIG. 388A.—DOYEN'S SUPRA-PUBIC RETRACTOR. For use in hysterectomy.

adnexa on the side corresponding to the tumour have to be drawn well forward, and the broad ligament is divided between two T-shaped clamp-forceps, the greatest care being taken to avoid wounding the bladder, which is often found in close contiguity. A circular incision is made if the tumour be large, or a longitudinal one will be sufficient should it be of a comparatively small size. The margins of the incision having been seized with clamp-forceps, the tumour is drawn forwards by a strong claw-forceps, and its covering peeled off gradually with the fingers, bleeding being controlled in the usual manner during this step. If there be close attachment of the tumour to the uterus, hysterectomy must be performed.

CHAPTER XXV.

VAGINAL HYSTERECTOMY FOR FIBROMYOMA.*

REGARDING as I do the operation by ligature as the most generally applicable and the safest, I will take it as the typical method of performing vaginal hysterectomy (see p. 502). Also, the majority of surgeons may not possess such special appliances as the angiotribe of Doyen, or the electro-hæmostatic forceps of Jacobs. Landau's operation by clamp alone, which was described fully in the last edition of this work, has practically become an operation of the past.

Landau's Operation.—In Landau's operation, the usual preliminary steps of freeing the uterus and adnexa having been taken, the latter were enucleated and any abscess débris evacuated. The broad ligaments were clamped at either side with Doyen's strong clamp forceps, supported by a slender pair of the same. The number of clamps applied to the broad ligament varied. When necessary, the uterus was divided with the scissors, from the anterior down to the posterior wall. Thus greater power was obtained over either half of the fundus. Hæmostasis was secured by forceps, and the vagina was dressed with iodoform gauze tampons which were not removed for forty-eight hours. Sometimes he practised complete morcellement of the affected uterus. After section of the uterus, the uterine segments were drawn down by strong claw forceps, and thus hæmorrhage was restrained. The broad ligaments were secured, and at times the uterus was brought away piece by piece with Landau's curved knife or special scissors. Such morcellation was absolutely necessary in some cases of fibroid, malignant disease, and extensive adhesions. Thus in Landau's operation no ligatures were used from first to last.

I have not myself operated by this method, but I have seen Landau do so on several occasions.†

* Vaginal hysterectomy for cancer of the uterus is separately described when dealing with the operative treatment of cancer.

† See a more detailed account of the operation by the author in the *British Gynæcological Journal*, February, 1897; also 'Vaginal Radical Operation,' *Technik und Geschichte*, Professor L. and Dr. T. Landau (Berlin, 1896), Verlag von August Hirschwald, unter den Linden, 68: translation by Eastman and Giles (1897: Baillière, Tindall & Cox, London).

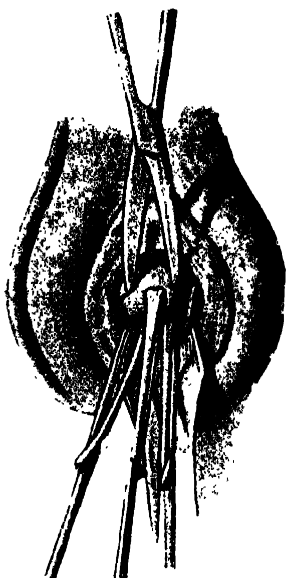


FIG. 389.—LANDAU'S OPERATION: UTERUS DRAWN DOWN.—ANTERIOR INCISION MADE WITH SCISSORS.

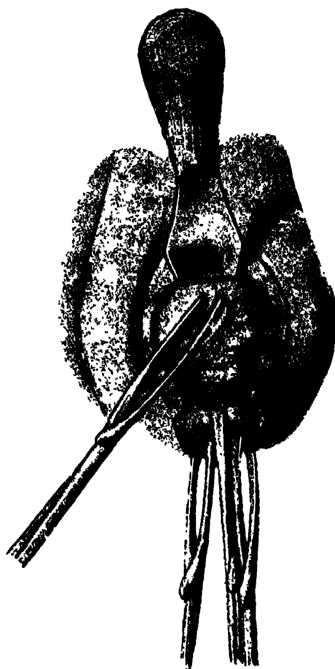
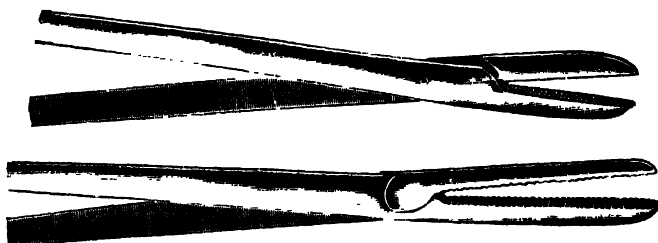


FIG. 390.—LANDAU'S OPERATION: ANTERIOR CUL-DE-SAC OPEN—DELIVERY OF FUNDUS.



FIG. 391.—MORCELLATION OF THE UTERUS IN LANDAU'S OPERATION—DIVISION OF THE UTERUS FROM ABOVE.

After the removal of the uterus, a long tampon of iodoform gauze was carried through the vaginal opening to support the bowel and



FIGS. 392, 393.—CLAMP FORCEPS. (Landau.)

omentum. The vagina was loosely packed with two more strips of the same gauze, and these were not removed for forty-eight hours.

Both the Landaus performed this operation for various adnexal diseases, such as complicated pelvic abscesses, double pyo-salpinx,

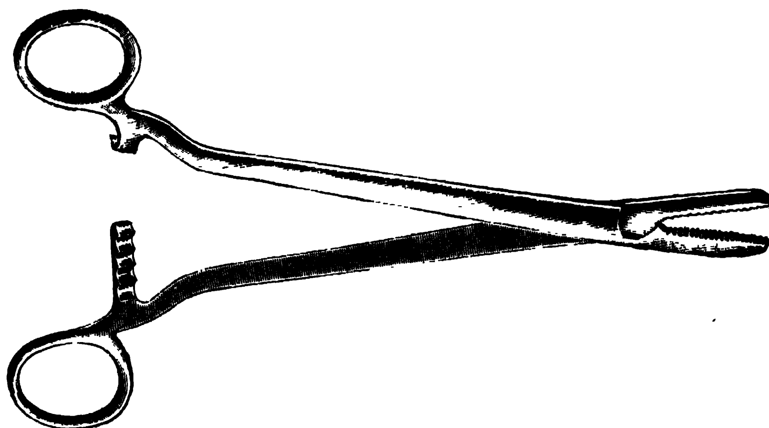


FIG. 394.—CLAMP FORCEPS.

and inflammatory diseases of the appendages with or without abscesses. All the cases I saw Landau operate upon, with the exception of one, did well, and the mortality of 191 cases of vaginal pan-hysterectomy was only $2\frac{2}{3}$ per cent.

Doyen's Vaginal Pan-Hysterectomy.—Doyen's operation, as performed with his clamps, may be thus briefly described. The first step of the operation is the same as for posterior colpotomy, the posterior vaginal cul-de-sac being incised from right to left, and

the posterior vaginal wall well depressed. The divergent blades of the scissors are used to open the peritoneum. Through the aperture

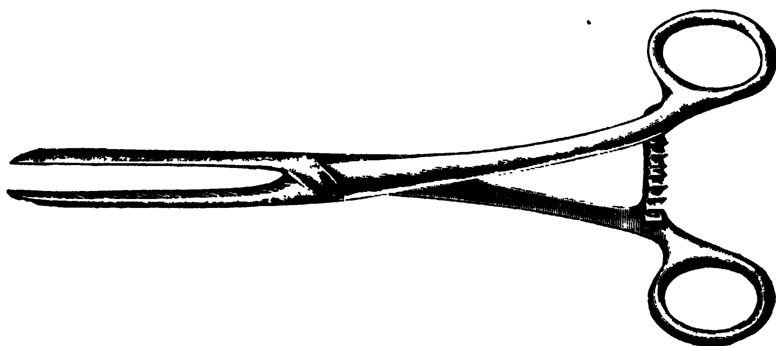


Fig 395.—Clamp Forceps.

thus made the fingers are introduced, and the uterus and adnexa

Fig. 396.—Application of the Tenacula in Morcellation of the Uterus to facilitate its Delivery. (Doyen.)

examined. This enables the surgeon to make the final decision as to the advisability of removing the uterus. The incision of the anterior vaginal cul-de-sac is next made after the circular incision of the neck has been completed. The bladder is avoided by cutting with the blunt point of a curved scissors towards the uterus, and, with the finger turned with the nail to the uterus, the mucous

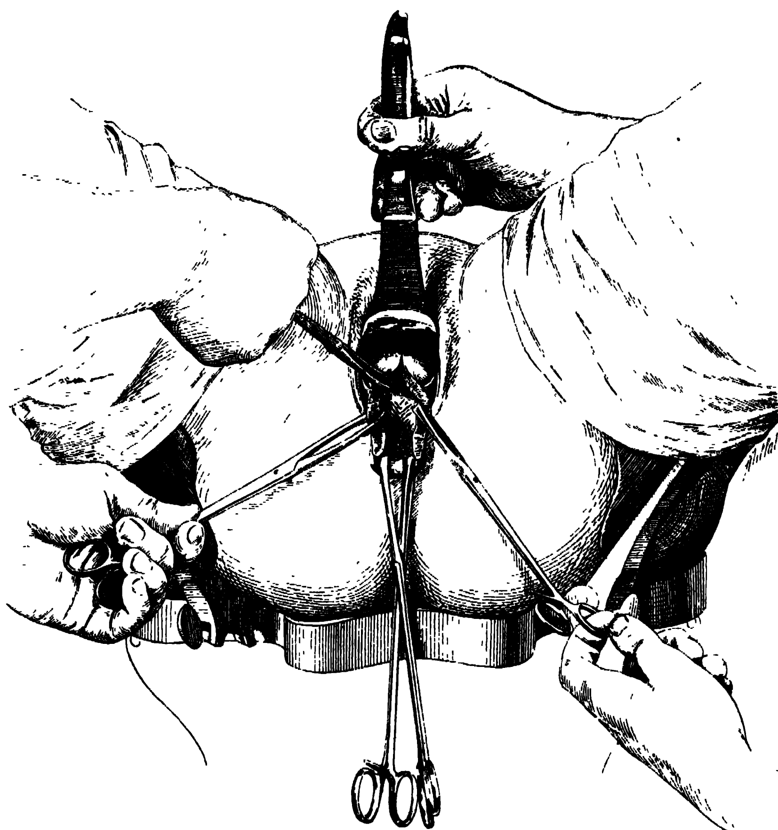


FIG. 397.—DRAWING DOWN OF THE UTERUS AFTER THE SECTION HAS BEEN COMPLETED—EXPOSURE OF FUNDUS. (Doyen.)

membrane is raised and the bladder is detached and got well out of the way. This detachment is often facilitated by working, with a small sponge or roll of gauze held in a sponge forceps, towards the uterine surface, the pressure being directed away from the bladder. The peritoneal fold is quickly exposed, caught with a forceps, and

opened with the same scissors. By diverging the blades the orifice is enlarged, and now a triangular-shaped retractor is slipped between the peritoneum and the body of the uterus. With tenacula the uterus is successively caught in stages from below upwards, until the fundus is seized and turned over to the vulva. Should this manœuvre be impossible, either through the narrowness of the outlet, or the size of the uterus, the organ is divided in the middle line as far as the fundus, and drawn downwards by the tenacula, fixed at either side of the lips of the incision. The uterus having been

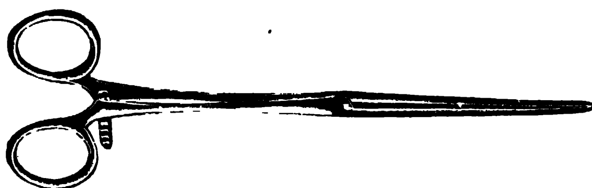


FIG. 398—DOYEN'S SLENDER CLAMP FORCEPS.

thus turned out, the adnexa are next brought down with the aid of an ovarian clamp forceps at either side. Doyen's clamps, large and small, are now applied on the broad ligaments from above down at either side, and the ligament is cut between these and the uterus. Should any vessel bleed, it is caught temporarily in a forceps. A ligature may be applied to any small bleeding artery. Doyen's experience, up to the commencement of 1898, led him to prefer, in vaginal hysterectomy, forcipressure to ligature, though, as he says, it was from no prejudice that he preferred the former, as for a long

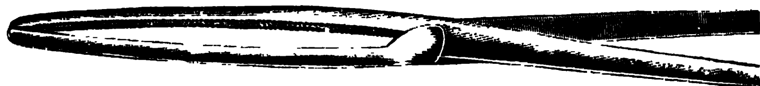


FIG. 399.—DOYEN'S STRONG CLAMP FORCEPS.

time he used the ligature, and still employed it under certain indications. He applied the ligature when the broad ligaments were very loose, and when the adnexa could be easily extracted. Here the ligamentary pedicles being very thin, a ligature is applied *en masse*. The thread is repassed a few times by transfixion, and retied. Each pedicle is fixed on a plane with the vaginal wound, and the peritoneum is closed by a purse suture, care being taken to pass the thread at each side through the peritoneum of the pedicles above their ligature. The anterior and posterior serous flaps being

carefully adjusted, a tampon is placed in the vagina, and allowed to remain in its position for four days, after which gentle douchings were commenced. The peritoneum unites above the ligatures, and the ligamentary stumps are eliminated by the vagina. Doyen

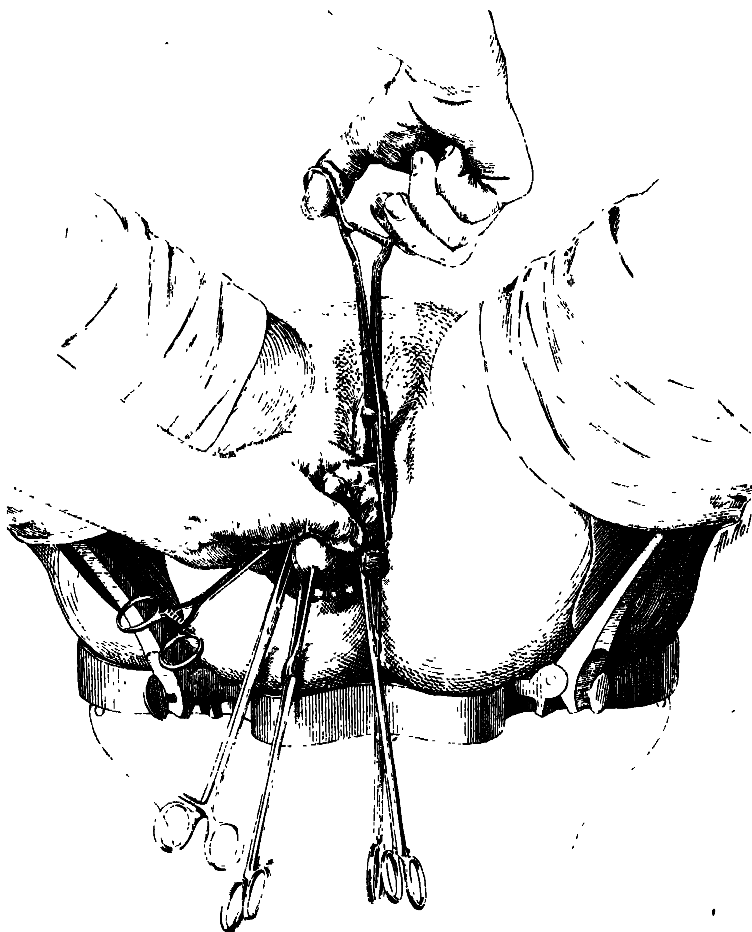


FIG. 400.—APPLICATION OF THE OUTSIDE STRONG CLAMP TO THE BROAD LIGAMENT.

prefers forcipressure in all cases where there is difficulty through adhesions or otherwise, or difficulty of removal of the adnexa, as the ligature then is difficult and does not afford as great security. He thus applies his clamp forceps :—

Taking the left adnexa by preference, these are drawn down, and the broad ligament is isolated between the left index and middle fingers, which are introduced from above, the one in front, the other behind, the ligament. The uterine neck has already been isolated

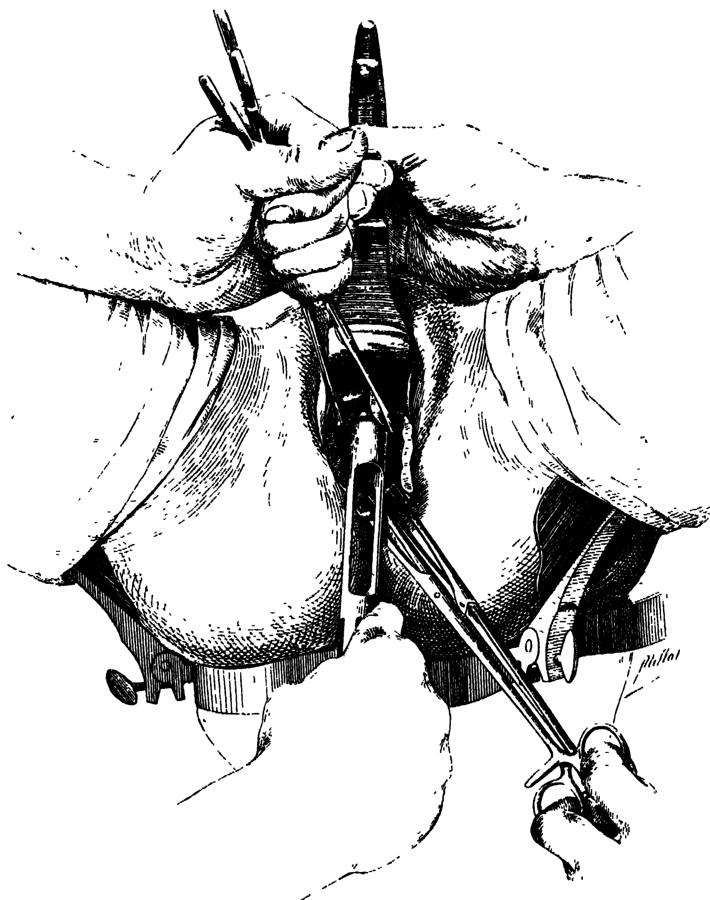


Fig. 401.—Vaginal Hysterectomy in a Case of Multiple Fibromata —Application of the 'Tube Tranchant.' (Doyen.)

as much as possible, and the fingers, reaching down as far as it, determine the lower border of the ligament. A large clamp forceps is then introduced by the right hand, from above down, embracing

the ligament. Should any intestine or omentum protrude, it is returned and supported by a compress, kept in position by a long curved forceps. The clamp is now firmly closed, after careful inspection of the part embraced by its blades. A second lighter clamp is placed in front, and the broad ligament is divided between it and the uterus. The adnexa remain adherent to the uterus.

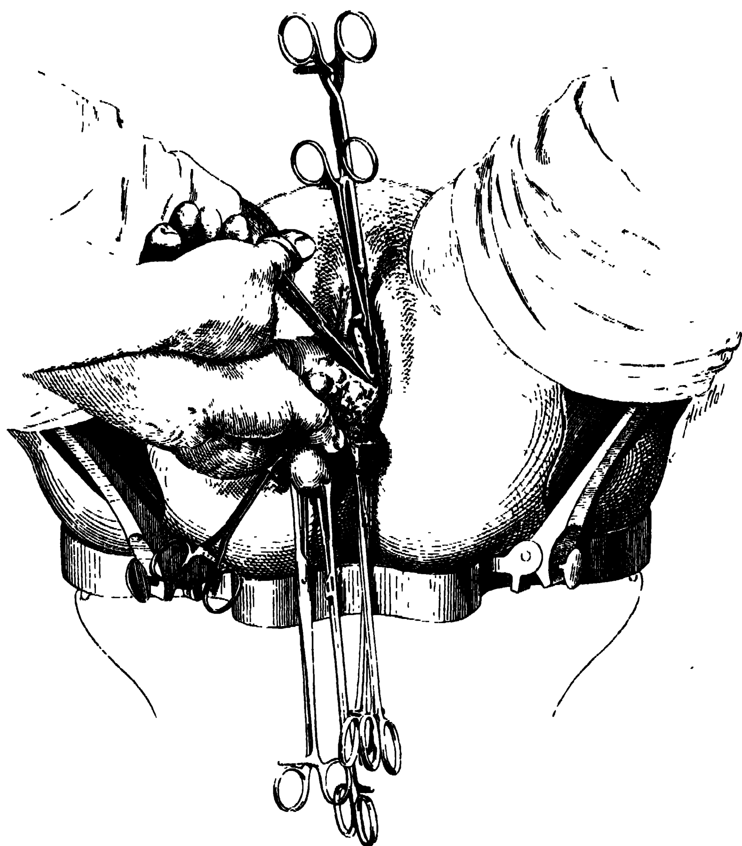


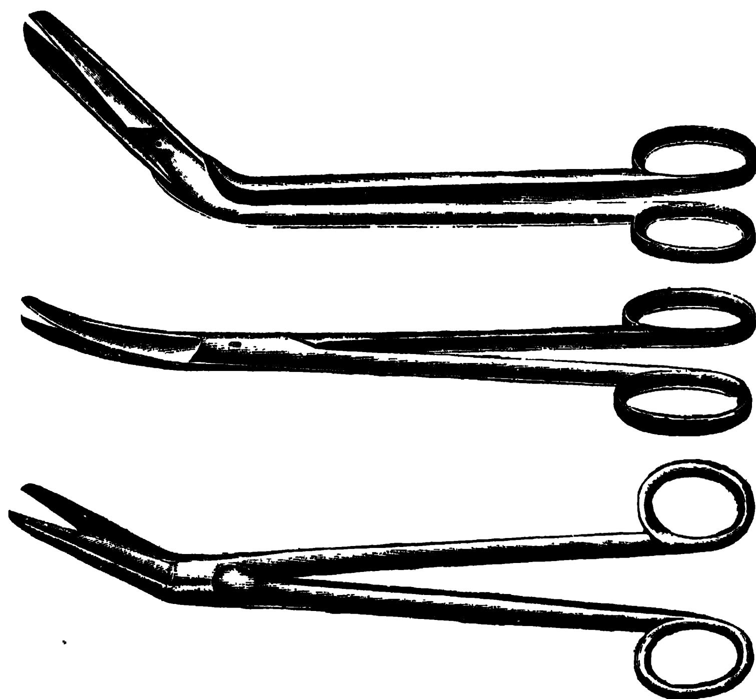
FIG. 402.—APPLICATION OF THE TWO CLAMPS, STRONG AND SLENDER, AND SECTION OF THE BROAD LIGAMENTS.

The same step is taken at the right side. The length of ligament embraced by the clamp is from five to six centimetres. The peritoneal compress is withdrawn, and the peritoneal toilet is completed with dry sterilized compresses, which are passed with a long curved forceps. The anterior and posterior peritoneal folds are seized

respectively with two straight forceps, and the four ligamentary clamps are brought together so as to come in contact. The anterior peritoneal fold is brought back, a compress is introduced behind the clamps, passing between these and the left lateral walls of the vagina. The large posterior retractor is then removed, and another compress is carried to the right and in front of the clamps. When these two compresses are in position, and the urine is drawn off, the patient is placed in bed.

Vaginal Hysterectomy for Fibromyoma.

It is not probable, as may be inferred from what has been already said, that any well-defined separation can be made which would have a binding influence on surgeons in making the selection



Figs. 403-405.—Useful Broad Ligament Scissors.

of laparotomy or vaginal hysterectomy in certain cases. Some surgeons are strong advocates for the vaginal route under circumstances and for conditions which others consider should be only

dealt with through the abdominal way. Dealing, as we are here, with fibromyomata, the question as to the choice of operation in cancer of the uterus may be deferred for the present.

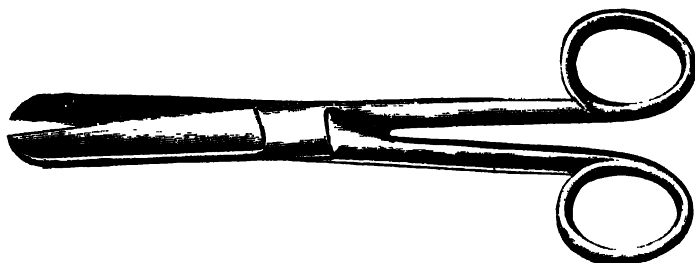
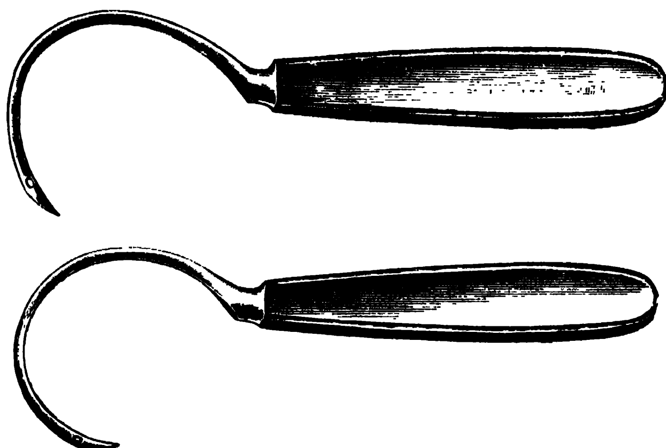


FIG. 406.—USEFUL HYSTERECTOMY BROAD-BLADED SCISSORS.

In speaking of vaginal hysterectomy, we may dismiss from our consideration those cases of fibromata which can be dealt with by myomectomy and enucleation. Next, with few exceptions, gynæcologists generally do not attempt to remove by the vagina myomata that exceed a certain size, generally placed at that of the fœtal head



FIGS. 407, 408.—VAGINAL HYSTERECTOMY NEEDLES.* (Olshausen's curves.)

at birth, though, for my part, I consider that tumours approaching such a size are far better dealt with by laparotomy. Also, I do not believe that it is prudent to attempt to remove by the vaginal route myomata associated with adnexal tumours or diseased conditions, that are likely to hamper seriously the delivery of the tumour

* The handles in the drawings are too short in proportion to the needles.

by the vagina. Such exceptions leave us but a small proportion of cases in which vaginal hysterectomy for fibromyoma is indicated. We may regard as the two most complete operations for small interstitial and subperitoneal myomata those of enucleation by

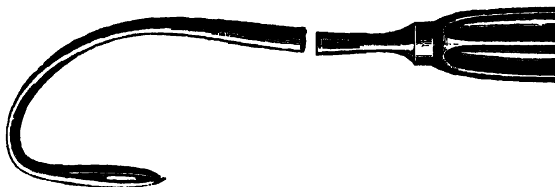


Fig. 409.—Jessett's Needle.

abdominal cœliotomy in the manner already described—that is, in cases in which they are of a certain size and are multiple; and secondly, those tumours that can be well removed by posterior colpotomy, though some prefer removal through the anterior vaginal

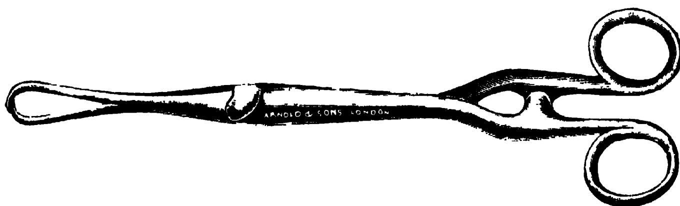


Fig. 410—Single Tenaculum.

fornix. There may be some very obese women in whom vaginal hysterectomy is preferable, when the removal of the tumour is feasible by the vagina; and there are cases to be met with in which unilateral adnexal cysts of various kinds, solid tumours of the ovary,



Fig. 411.—Claw Forceps.

or tubal distensions, complicated small fibromata, and in which preference may fairly be given to the vaginal method. By the preliminary colpotomy the adnexal cyst, tumour, or dilated tube

is dealt with, and then the uterus is removed with comparative ease.

Veit, in comparing vaginal hysterectomy with cœliotomy, says that the former operation is preferable in the instance of a movable tumour situate towards the pelvis, and in the inferior region of the abdomen. The danger in vaginal hysterectomy lies in the difficulty of securing the vessels. In cœliotomy it arises from septic infection. Hubert draws these conclusions from Veit's operations on submucous myomata:—

1. In the case of a small submucous myoma the removal should be effected by an incision in the anterior wall of the cervix uteri, followed by enucleation.

2. When there are two submucous myomata, or only one of larger size, the incision should be made in the posterior wall as well as in the anterior, the volume of tumour should be reduced, and the enucleation completed.

3. A smaller interstitial myoma can also be removed by enucleation without hysterectomy. It is for the second and third class of cases that the method of Veit constitutes a real progress.

4. If a combination of interstitial and submucous myomata be found, it is preferable in most cases to perform hysterectomy.



FIG. 412.—DOUBLE TENACULUM.

5. Voluminous interstitial myomata should be treated by the vaginal method, according to the results of a judicious examination.

Berger concisely summarizes the indications for vaginal hysterectomy:—

'When, after failure of all other means, the life or health of the patient is threatened by hæmorrhage, pain, pressure symptoms, or inflammatory and degenerative changes in the tumour.

'When, after careful examination under narcosis, the ovaries and tubes are found to be unsuitable for castration, owing to inflammatory adhesions.

'When the general condition of the patient is too bad to admit of cœliotomy.

'Under the last heading fall those cases of excessive anæmia and debility in which the opening of the abdomen is very dangerous. There are, furthermore, some cases in which after oöphorectomy the hæmorrhage has persisted, and when, after total extirpation, the patient has been entirely cured, with fresh strength and a quite satisfactory general condition.

'The difficulty of the operation largely depends on the size of the tumour in relation to the narrowness of the vagina; if the latter be very narrow, even the minor operations of shelling out the tumour, etc., may be as difficult as total removal.

'In many cases, after the broad ligaments have been tied, the size of the tumour can be diminished by incision and enucleation; or the uterus may be removed piecemeal, as may seem best.' *

Hysterectomy by Ligature.—The ligature as a means of securing hæmostasis has now almost universally taken the place of the clamp.

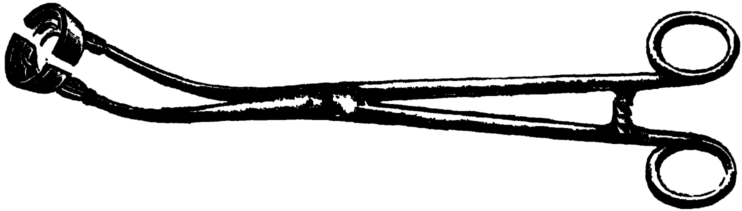
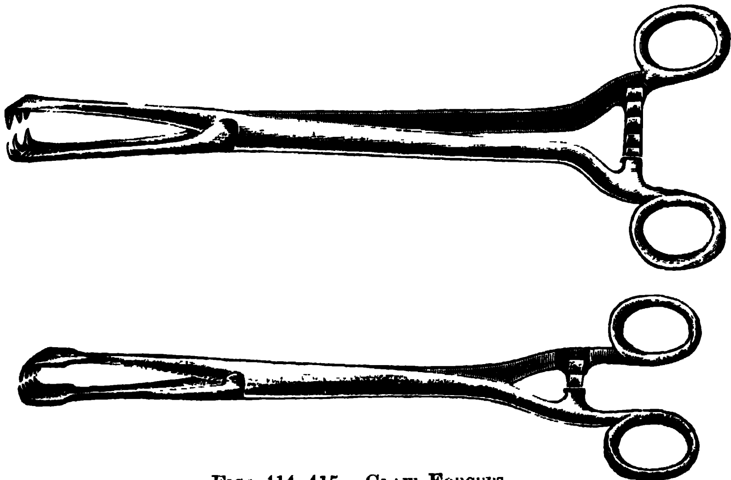


Fig. 413.—O'Sullivan's Uterine Tractor for Use in Hysterectomy.

Still, in proceeding to perform the operation, it is well to have at hand some various-sized clamp forceps for temporary hæmostasis, should they be required. The operation is performed thus: All the preliminary antiseptic and aseptic precautions having been taken, the woman is placed in the hysterectomy position, the



Figs. 414, 415.—Claw Forceps.

buttocks being brought well over the edge of the table, and the thighs opened as wide as possible. A full-sized Martin's retractor is now used to draw the posterior wall of the vagina and perinæum well back. The bladder, which has been emptied, is explored with

* *Brit. Gyn. Jour.*, Nov., 1895, and Aug., 1896.

the sound, and its relation inferiorly to the uterus and vaginal cul-de-sac determined. The cervical lips at either side are now seized with single tenacula, both of which are grasped in one hand. The uterus is now drawn down as far as possible, and a circular incision is made round the cervix a short distance below the vaginal fold. The mucous membrane is now carefully raised and pushed away with the index finger. When this has been effected the posterior fold of peritoneum is sought for, and is caught with the forceps and opened with scissors. The opening is enlarged by diverging the blades of the scissors, and with the finger. The tenacula being firmly held in the left hand, the right forefinger nail is now introduced underneath the anterior mucous fold, and this is stripped thoroughly from the uterus, thus at the same time detaching the bladder, which it were well to again examine with the sound. The medium-sized retractor is now passed anteriorly under the

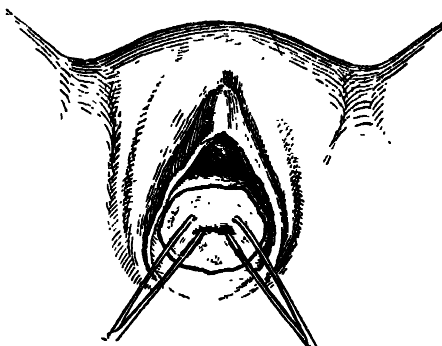


FIG. 416.—PRELIMINARY INCISION ROUND CERVIX.

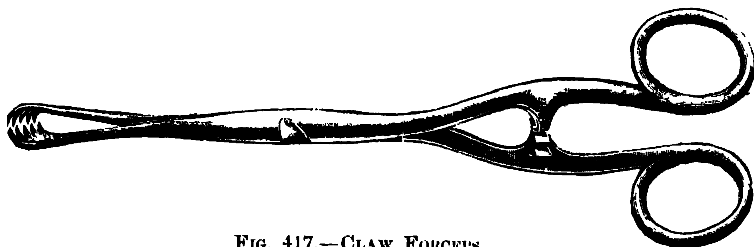


FIG. 417.—CLAW FORCEPS.

mucous membrane, and the peritoneal reflexion in front is carefully sought for. With a dressing-forceps and blunt-pointed curved scissors, this will be found with but little difficulty. When it is drawn down and opened with the scissors, the opening being enlarged by diverging the blades, it is further freed by running the point of the forefinger from side to side of the aperture. The anterior peritoneal edge is now sutured to the border of the vaginal mucous membrane, by a continuous or interrupted gut or silk suture. The uterus is

drawn to the right side, and a finger is passed by the side of the cervix as far as the lower border of the broad ligament. The

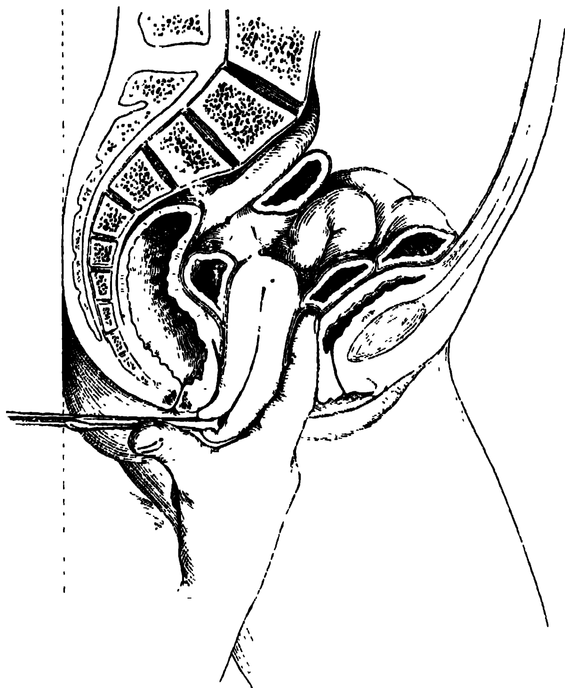


FIG. 418.—DETACHMENT OF THE BLADDER BY THE FINGER AFTER THE OPENING OF THE ANTERIOR CUL-DE-SAC. (Doyen.)

pulsating uterine artery is now felt for, and a curved Olshausen's needle (Figs. 407, 408) is carried close to the cervix, and the artery

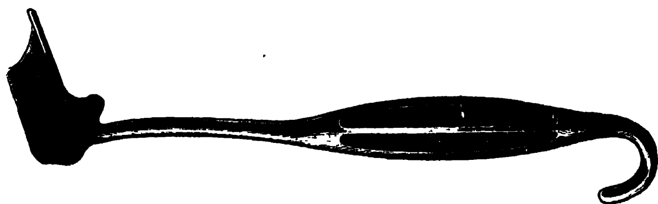


FIG. 419.—MARTIN'S RETRACTOR.

is ligatured. If the uterus be high, and any difficulty be experienced in securing the ligature, the tightener of Schauta (Fig. 354) may be used to secure it. The threads of silk are passed into the grooves at

the extremity of the instrument, and are brought down and fixed in the slot, which is easily opened by slight pressure with the fingers. By compressing the handles the blades diverge, and thus the first



FIG. 420.—LARGE RETRACTOR OF MARTIN, TO PROTECT THE BLADDER.

loop of the knot is tightened. The instrument is withdrawn, and the knot is completed.

There is, however, very little difficulty as a rule in securing the



FIG. 421.—MARTIN'S LARGE PERINÆAL RETRACTOR.
Both of the above retractors are useful also in colpotomy.

uterine vessel, the important point being not to pass the needle too far from the side of the cervix, so as to avoid including the ureter. A scissors, curved on the flat, with fairly broad blades, is now

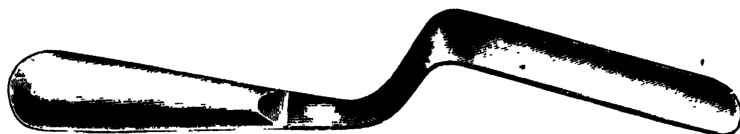


FIG. 422.—LATERAL RETRACTOR.

passed close to the uterine wall, and the ligament is detached by cutting close into, or even including, a portion of the uterine tissue. Another ligature is now passed in the same way above the first, and

further section of the ligament is completed. A third ligature is generally required for further detachment of the broad ligament. We have now arrived near its upper border, around which the finger is hooked, drawing into view the tube and ovary of that side. If these be healthy they may be left, at least at one side, and the upper portion of the ligament is firmly secured before its division, suffi-

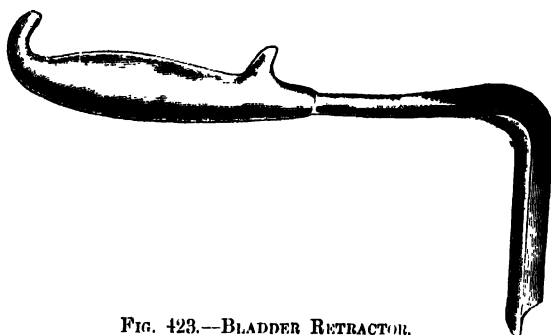


FIG. 423.—BLADDER RETRACTOR.

cient pedicle being left to provide against the slipping of the ligature. If, on the other hand, the adnexa are removed, these must be drawn well down, and the ligature passed between these and the pelvic wall. The broad ligament having now been completely severed, the uterus is hooked forward by the vulsella or the finger, and the broad ligament of the opposite side is ligatured in like manner to its

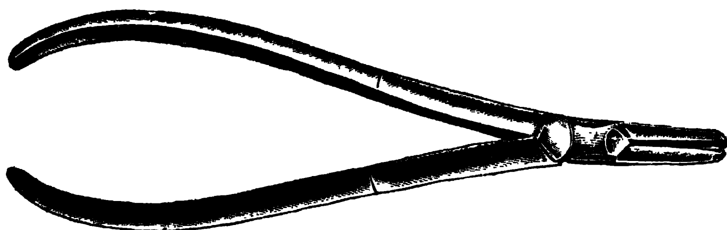


FIG. 424.—MARTIN'S NEEDLE-HOLDER.

fellow from above down; or the same proceeding may be adopted as before, and the uterine arteries secured first. The uterus is now completely detached, and we proceed to examine all bleeding points, and to finally secure these with ligature, not ceasing as long as there is any escape of blood, no matter how slight. Should some high-placed vessel resist our efforts, and there be still trickling or oozing, it is better to resort to forcipressure rather than take

the chance of post-operative hæmorrhage. Any protruding loop of intestine or omentum is cautiously pushed back, and the severed tissues and peritoneum are carefully but gently dried with sterilized gauze, and a final examination is made for any bleeding point. Should a ligature seem to be dangerously loose, or a pedicle cut too close, it is better to re-secure it. In short, remembering that the

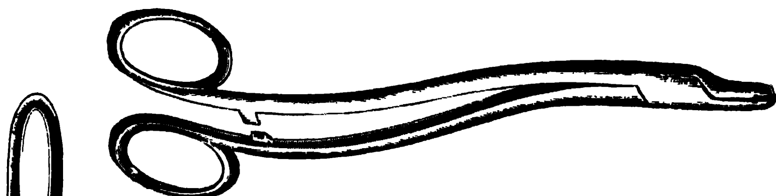


FIG. 425.—SCHAUTA'S NEEDLE-HOLDER (one of the best I know of).



FIG. 425A.—FENESTRATED RETRACTOR.

two principal dangers of vaginal hysterectomy are, first, inclusion of, or injury to, the ureter, and, secondly, hæmorrhage from insecure ligation of an artery, or loose tying of a pedicle, it is obvious that too great care cannot be taken so as to avoid the former or to protect our patient against the latter.

The ligatures at either side are now tied together, but are left sufficiently long to be removed at the end of the

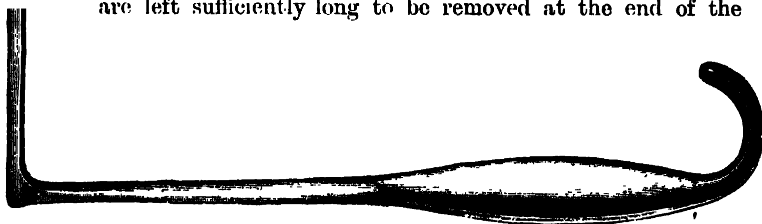


FIG. 426.—OLSHAUSEN'S RETRACTOR.

day; a strip of sterilized iodoform gauze, two inches in breadth, and some eighteen inches in length, is passed between the ligatures so as to loosely fill the space between the broad ligaments. The end of this is tied, and turned up over the pubes, and another tampon of sterilized gauze supports this, and is also tied, the knots on both

strings indicating the respective tampons. The gauze pack must not be too loose in the vagina. Some operators, as, for instance, Schauta, in the majority of cases in which drainage is not required, unite the peritoneum across, or at either side. Kelly unites it in the centre, leaving an aperture at either side. The last step is the

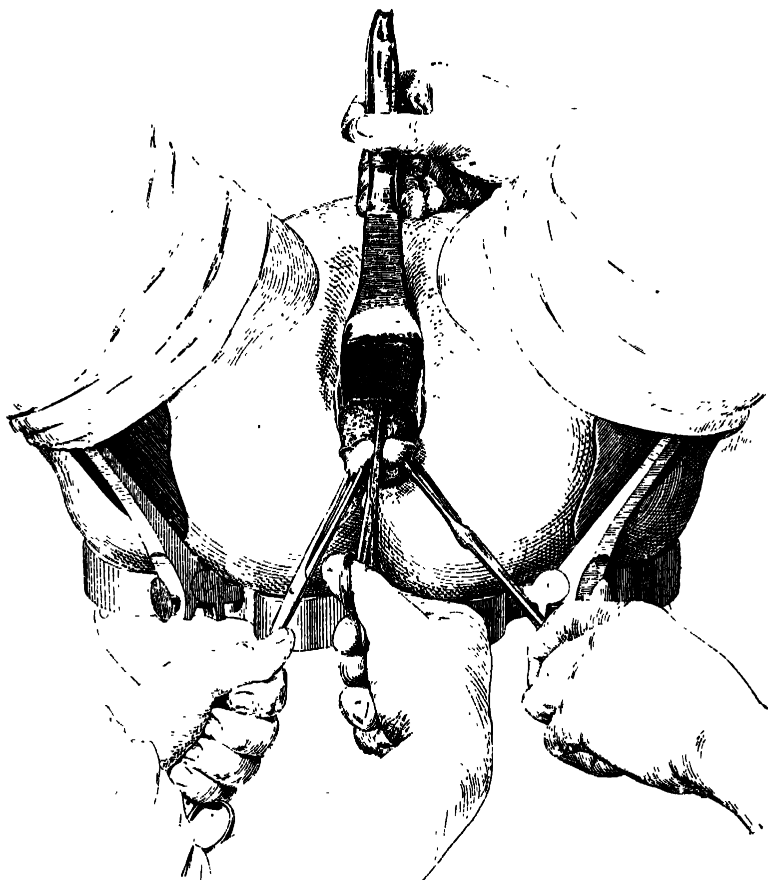


FIG. 427.—DIVISION OF THE ANTERIOR WALL OF THE UTERUS AFTER THE OPENING OF THE ANTERIOR CUL-DE-SAC.

passage of the catheter so as to relieve the bladder and afford proof that it is uninjured.

This description of vaginal hysterectomy is to be taken as specially applicable to the operation for myoma or other tumours in which

the peri-uterine structures are not involved, and where there are not diseased states and tumours of the adnexa, or complications arising out of adhesions. When these are present, the operation must necessarily vary according to the conditions which are met with as it proceeds. The size of the tumour, the difficulty of reaching the vessels, of bringing down the adnexa, of severing or detaching adhesions, of controlling unexpected and obstinate bleeding, and, in the case of cancer, of going sufficiently wide of the uterus to remove suspicious tissues and glands, may each and all compel the surgeon to vary his plan of operation. Thus the time occupied will vary from twenty minutes to over an hour, or even longer, according to the presence or absence of complications. The internal strip of gauze is not removed for eight or ten days.

The operation is greatly facilitated in many cases by the division of the uterus after the manner of Doyen, especially in cases in which there are adhesions and adnexal complications. Or the size of the uterus may be reduced, as has already been shown in Landau's and Doyen's operations, by the exsection of triangular portions taken from its wall, grasping the fundus higher and higher at each side with claw forceps. In this manner its bulk is reduced, and we have obtained room to attack the appendages.

Vaginal Pan-Hysterectomy—Bisection of the Uterus.—Pryor describes an operation of vaginal hysterectomy, which, in its first stages, is almost identical with that which I have seen Schauta several times perform.

'The first step, after incision of the mucous membrane, is to split the uterus in the middle line into two halves. Each half with its adnexa can be dealt with separately, free from any attachment to the other. One half of the uterus is shoved up into the pelvis, the other is drawn down. This latter will come down from beneath the bladder, and be outside the body. The fingers passed in behind this half will be behind the corresponding half of the broad ligament, and can separate adhesions of the adnexa with ease. The appendages liberated, they are returned, with their half of the uterus, into the pelvis. The appendages of the opposite side are freed in the same way.* Two forceps are now applied to the broad ligament, one to clamp the ovarian artery from above incision down to its point, and the other in the same way to clamp the uterine, and the appendages with half the uterus removed. The other side is clamped and amputated in the same way. On each side iodoform gauze is introduced between the forceps and the vagina. The vagina is filled with gauze, which must be neatly packed up to beyond the points of the

* Schauta here uses ligatures, not clamps; he attacks each side separately, using his special needle-holder and ligature-tightener.

forceps. The forceps are taken off in forty-eight hours. The first dressing is made in from seven to twelve days.' *

After-management of Case.—The same treatment is adopted as after laparotomy. The patient is placed on her back, the bladder relieved at regular intervals, and nourishment administered much as in the instance of the abdominal operation, though here we may resort earlier to soft solid foods and nourishing liquids. The bowels are moved on the third day, preferably in the first instance by an emollient enema of salad oil and thin strained gruel. Should this not act, the patient may have a few grains of calomel followed by a saline purgative. When the internal strip of gauze is removed, the vagina is still kept loosely packed with a fresh tampon of the iodoform gauze or chinosol. I generally now use after the first pack of iodoform, moist chinosol gauze, thus avoiding any toxical effects that might follow from the iodoform. If there has been a prolonged operation, and shock be threatened or be present, a litre of artificial serum should be injected.

Hæmorrhage.—Secondary hæmorrhage, attended by collapse, after vaginal hysterectomy, is the most alarming of the after consequences of the operation. Should it occur, as may be suspected from the signs already enumerated, no time must be lost in the endeavour to control it. The patient must be raised on to the table, with a good artificial light thrown on to the vulva. An anæsthetic is administered, and the necessary retractors, hæmostatic forceps, dabs, and sponges, with the dressings placed ready at hand. Immediately the patient is under the anæsthetic, the packs are removed from the vagina, retractors are placed in position, and a good light thrown on to the pelvis. By gentle traction on the ligatures the broad ligaments may be brought into view, and the loose loop of ligature be seen, and the bleeding point immediately clamped. Otherwise, the ligament at the side from which the bleeding comes must be drawn down with forceps, the bleeding point sought for, and a pair of forcipressure forceps now made to include the bleeding area, and left on. Under any circumstances, should the bleeding persist, there must be no delay or temporizing, but the bleeding tissues must be boldly clamped at either side. These forceps should be left from thirty-six to forty-eight hours.

Injury to Ureters.—In the chapter on ureteral surgery, reference is made to the management of divided or injured ureters.

* *Amer. Jour. Obstet.*, 1899.

THE COMBINED METHOD.

In certain cases, either from difficulties met with in dealing with the adnexa, or from the size of the tumour, and the presence of multiple or pedunculated myomata, it may be necessary to complete the operation by abdominal cœliotomy. Here, after the preliminary steps of the operation have been taken by the vagina, an antiseptic tampon is placed in it, the hands are thoroughly sterilized, and the patient is placed in the Trendelenburg position. The abdomen is now opened, and the remainder of the operation is performed as in pan-hysterectomy, by the abdominal route. Such a procedure is to be avoided when possible, as submitting the woman to a considerable prolongation of the operation, and the additional risk involved in opening the peritoneal cavity from the abdomen, but such a step would be better than to persist in the endeavour, through too narrow an aperture, to deliver a large and probably adherent mass, or matted

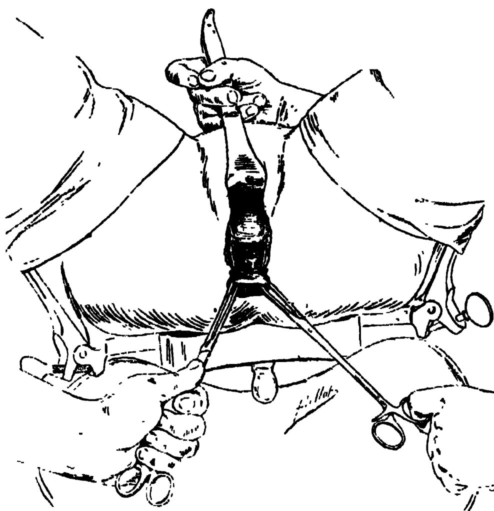


FIG. 428.—UTERUS EXPOSED AND DRAWN DOWN—ANTERIOR CUL-DE-SAC OPENED.* (Doyen.)

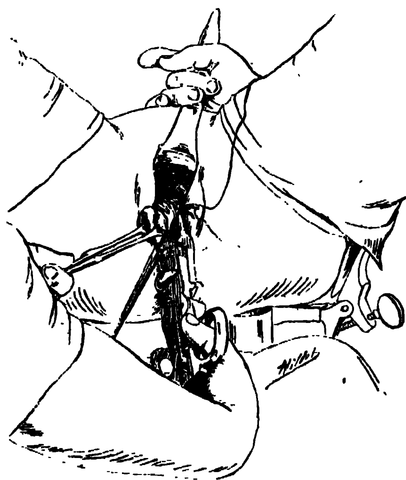


FIG. 429.—PRESSURE FORCEPS APPLIED TO THE LEFT BROAD LIGAMENT AND UTERINE ARTERIES FROM BELOW. (Doyen.)

* See next page—Doyen's method of angiotripsy.

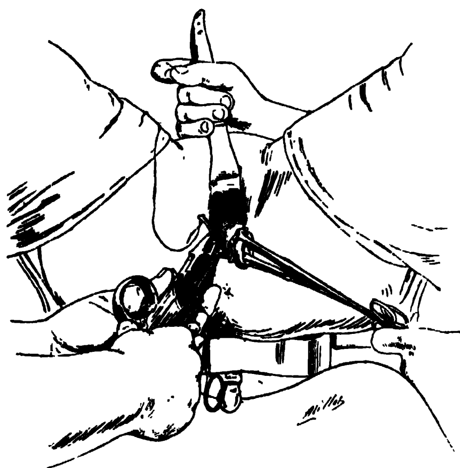


FIG. 430.—PRESSURE FORCEPS APPLIED TO THE RIGHT BROAD LIGAMENT AND UTERINE ARTERIES FROM BELOW. (Doyen.)



FIG. 431.—PRESSURE TO UPPER PART OF LEFT BROAD LIGAMENT AND OVARIAN VESSELS FROM ABOVE. (Doyen.)

and adherent pro-cystic adnexa, which with the uterus resist delivery even after morcellation.

Stanmore Bishop brought forward cases in which he practised the combined method before the Gynæcological Society,* and advocated strongly the adoption of this plan as an alternative to be resorted to in such cases as those instanced, rather than push delivery of the uterus and adnexa by the vagina to the verge of rashness. Bishop uses a coating of celloidin for covering the abdominal wound in cœliotomy.

The steps of Doyen's latest *vaginal hysterectomy* are as follows:—

Having incised the posterior fornix, he opens the pouch of Douglas, and explores the pelvic cavity. The anterior fornix is next incised, and the bladder detached, the broad ligaments at either side are now secured by the pince, which is applied for about half a minute. The uterus, having been drawn down, is divided in two by a median or V-shaped incision, the latter being that of selection for a large tumour. This allows of the delivery of the

* *Brit. Gyn. Jour.*, Feb., 1899.

fundus and the adnexa; an application of the pressure forceps is now made to each broad ligament, and the complete separation of the uterus is effected. The upper border of the broad ligament is finally crushed, and ligatures are subsequently applied. A silk thread is tied in the groove formed, and, when the pressure forceps are removed, the ligature is gradually tightened so as to embrace the entire broad ligament. The peritoneal flaps are now brought carefully together, and the vagina is tamponnaded.

*Le Bec's Operation—Pan-Hysterectomy.**

The tumour having been turned out through the incision, and the adnexa raised and stretched, two ligatures are placed, one ligating the ovarian vessels on the outer side of the ovary, and the other the Fallopian tube at the inner side of the ovary. The broad ligament is cut between the two. The round ligaments are then separately tied, and the bladder is carefully separated from the anterior surface of the tumour as far as the cervix. In order to complete this detachment of the bladder, the peritoneum is incised on the anterior surface of the fibroma so as to form a peritoneal flap. Care is taken to avoid the ureters by pushing the bladder downwards and forwards, and, if the tumour be very large, the greater part is removed above a temporary elastic ligature, the peritoneal flaps being left. The next step of the operation is the incision of the anterior and posterior fornices of the vagina to the extent of from 2 to 3 centimetres. This is done on a long forceps inserted into the vagina, so as to stretch the fornix, and on it the vaginal roof behind and in front is incised, the incision being enlarged by opening the blades of the forceps to the extent of 5 or 6 centimetres. By means of the same forceps passed through the vagina and pouch of Douglas into the abdomen, one end of a silk thread 40 centimetres in length is seized, drawn into the vagina through the posterior aperture, and is carried back into the abdomen through the opening in the anterior fornix. The loop thus formed between the vagina and abdomen includes all the vessels of the broad ligament at one side of the uterus, which are thus ligated. The same plan is pursued on the opposite side. Nothing now remains but the pedicle of the tumour, which is extirpated by dividing it in the middle line, and cutting away as much as possible of the two halves, taking care not to encroach on the lateral ligatures. The latter are now seized by the forceps, passed through the vagina, and by this means both halves of the pedicle are drawn down into it. The peritoneal flaps removed from the fibroma, anteriorly and posteriorly, are now sutured with catgut, and the abdomen is closed. The vagina is thoroughly cleansed, and a drainage-tube inserted into it for washing-out purposes. The pedicle ligatures are brought away on the fifteenth day. Le Bec in all uncomplicated cases closes the pelvic peritoneum; not so, however, when there has been any serious trouble of the adnexa or extensive adhesions, in which cases he drains through the pouch of Douglas for forty-eight hours. He finds this method specially advantageous in certain cases of fibroma with cancer, when vaginal hysterectomy cannot be performed, and in fibroma complicated with salpingitis.

* British Medical Association Meeting, 1896.

CHAPTER XXVI.

HYSTERECTOMY—POST-OPERATIVE TREATMENT.

When the operation is completed (see chapter on Asepsis) the patient is placed in bed with a pillow under the knees and hot bottles to the feet. The administration of a stimulant by the rectum may be necessary.

Shock.—Among the chief factors which directly cause shock after an abdominal operation is prolongation of the operation beyond the capacity of the patient's vital resistance. The evil influence, however, of the length of an operation in causing shock will largely depend upon the unavoidable accidents which have occurred during its performance, and which have been attended by such other predisposing causes as the following: hæmorrhage, exposure and handling of the bowel, much dragging about of the parts operated upon, inadequate precautions for maintaining the body temperature, and prolonged anæsthesia.

In referring to death after abdominal cœliotomy, Smyly recapitulates the predisposing causes of shock.* Amongst these he dwells specially on the influence of debilitating diseases, such as cancer, bleeding myomata, and granular kidney, but more particularly, he says, is failure of the heart likely to follow in the case of those women who have what is commonly called weak hearts, with rapid and weak action. In such cases there is a tendency to general stasis of the circulation, as also of the lymph-currents in the peritoneal cavity. Asepsis, a sound heart with undisturbed circulation, and a normally acting peritoneum, are the three most important factors in resisting the predisposition to shock.

A prolonged operation, much exposure and handling of the bowels, involving derangements of the functions of the peritoneum, are universally acknowledged to be specially dangerous in women

* *Brit. Gyn. Jour.*, May, 1899.

in whom we are apprehensive of the occurrence of shock: Walthard and Sänger, to obviate the influence of a dry peritoneum in this respect, advocate the use of warm, moist protecting compresses; but others, as Zweifel, and Smyly himself, prefer dry sterilized gauze. I generally use warm, moist compresses squeezed nearly dry for covering the bowel and exposed intestine, but also employ the dry sterilized gauze.

Signs and Symptoms.—Should alarming shock threaten during an operation, it is indicated by the extreme pallor of the face and coldness of the body, while, at the same time, the pulse becomes more rapid and indistinct. The respiratory movements are weaker, and become almost imperceptible. When such conditions occur, they are indications for increased care and precautions anticipative of post-operative shock. Anxiety is further added to should there be difficulty in rousing the patient from the anæsthesia. When, subsequent to the operation, such conditions are followed by a weak, compressible, and very rapid pulse, sustained coldness of the body, with perspiration and pallor, while the whole appearance of the patient is such as to indicate impending death, most active measures must be taken to counteract these conditions. A hypodermic injection of a thirty-sixth of a grain of strychnine should be given at once with a drachm of sulphuric ether, and a brandy enema administered. The best enema is one of two ounces of brandy with six ounces of warm beef-tea. The hypodermic injection and the enema are administered before the patient leaves the table. The strychnine is repeated in smaller doses at intervals, varying according to the degree of shock, as also are the brandy enemata. Every possible means is taken to sustain the heat of the patient by hot-water tins and bottles to maintain the body temperature. The foot of the patient's bed is slightly elevated, and in the mean time artificial serum is injected subcutaneously. A persistent subnormal temperature and the absence of the evidences of reaction in pulse, temperature, skin, and consciousness are the most unfavourable signs. From such a condition of shock, attended by transient delirium, the patient may pass through the stage of reaction into a state of traumatic delirium, the degree of intensity of which varies, and which may be succeeded either by the subsidence of the symptoms of shock, a gradual lessening of the pulse, a rise of temperature, restoration of the general warmth of the body, better appearance of the patient generally, a return to consciousness, and the cessation of delirium. In such cases it is well to proceed

cautiously in the administration of fluid by the mouth. The stomach does not, under such conditions, absorb well, and it is better to trust to the administration of nutriment and stimulant by the rectum. The duration of the treatment will depend upon the time over which the symptoms of shock are prolonged, and of necessity will be modified accordingly.

The Use of Artificial Serum.—In injecting artificial serum into the cellular tissue of the mamma, the needle is inserted for about two inches, and when the fluid begins to distend the part, absorption is accelerated by manipulating the gland.* The serum is allowed to flow until the requisite quantity, from half a litre to a litre, is injected. The small wound left is closed with collodium. The most convenient solution is that of distilled water with chloride of sodium, sterilized by previous boiling for twenty minutes. It should be of the temperature of the body when injected, and therefore ought to be of at least 100° when placed in the receiver for use at the time of injection. Ten ounces may be introduced in a few minutes, and the quantity may be increased to over two litres without causing any symptoms of intolerance. This, however, should be the maximum at one sitting, and four litres within the twenty-four hours the outside limit in the great majority of cases in which the injection is indicated. The artificial serum may also be administered by the rectum.

Food.—I limit food to the administration of small quantities of hot water, and possibly some barley-water, for the first twenty-four to thirty-six hours. Occasionally I allow a little freshly-drawn tea. As a rule, not until the third day do I give any milk, and then it is diluted.

If vomiting begins and continues, all nourishment is given by the rectum. After its cleansing with boric acid injection, enemata of beef-tea, with varying quantities of brandy, as indicated by the strength, alternated with milk and yolk of egg, are given. Generally I find it better to abstain in doubtful cases from concentrated meat essences until forty-eight hours at least have passed, but this must depend upon the condition of the patient.

Brand's, Valentine's, or Wyeth's are those most frequently used. Carnick's beef peptonoids, in the form of suppositories, are useful.

* See chapter on Asepsis (p. 122) for the kind of needle required. An ordinary large aspirating needle will answer the purpose. Also, for the effects of, and indications for, saline irrigation of the peritoneal cavity, see chapter on Ovariotomy for Ovarian Cystoma.

Of late, operators are more inclined to feed patients earlier after operation and more generously. My experience, however, does not lead me to recommend such early feeding. It is far safer to feel one's way, and to wait for the indications for solid food by the progress made, the quietness of the stomach, and absence of sickness, the pulse, temperature, and freedom from abdominal distress.

Morphia.—It may well be combined with atropine in subcutaneous injection. Rarely do I give morphia or opium. If, however, the choice has to be made, as between sleeplessness and exhaustion from pain or nervous restlessness and irritability, and the ill effects of the morphia in interfering with digestion and intestinal action, the resort to morphia must be regarded as the lesser evil.

Tympanitic Distension.—Tympanitic distension and flatus is best met by the passage of a long rectal tube, which may be worn for a short time and passed three or four times in the day. This may be done with the patient in the knee-elbow position, as advised by Swatman. The light application of a Paquelin's or electric cautery to the abdominal wall in gentle touches, just sufficient to cause red lines, is an admirable method of treating tympany.

Management of the Bowel.—Much has been written on the management of the bowel. It must be remembered that if a patient has been properly prepared for operation, and the bowel thoroughly emptied beforehand, there ought not to be that necessity for early administration of purgatives advocated by some surgeons. Their use must depend upon the symptoms of the particular case. If everything is going on favourably we may safely wait until the third, fourth, or even the fifth day, and then commence with an enema of salad oil with strained gruel. Turpentine is a most valuable drug in cases of tympanitic distension, and may be used in the injection in an emulsion of yolk of egg with dill or carraway water. I follow the plan advocated by Baldy, of giving drachm doses of sulphate of magnesia every half-hour for five or six doses. This is usually sufficient; if not, I then resort to an enema. A seidlitz powder is another simple, and with some an efficacious, means of opening the bowel for the first time. In other cases, if the saline cannot be given, and the enemata do not act, I resort to calomel, a few grains being placed on the tongue, and repeated after a certain time, if necessary.

Use of the Catheter.—With regard to the bladder, the water is drawn off with glass catheters, treated in the manner I have referred to in the chapter on Asepsis, every six hours; and the

surgeon should see specimens of the urine for several days, so as to judge of its condition and the state of the bladder.

Temperature of Room and Quiet.—The temperature and ventilation of the room has to be carefully supervised, and neither relatives nor friends should see the patient for a few days after the operation.

Dressing of Abdominal Wound.—If it be thought well to look at the abdominal wound, the hands of the surgeon and nurse should be prepared, and towels wet with carbolized water should be ready at hand with all necessary dressings on a tray. The bandages having been carefully removed, the deeper dressings are covered with the warm towel, and this is allowed to remain on for a few minutes. Then the dressings are carefully removed, and the wound inspected. Should these be soiled, they are quickly replaced by fresh sterilized ones, and the bandages re-applied.

In the great majority of cases it is not necessary to disturb the actual dressing until the fifth or sixth day at the earliest, if it be properly kept *in situ;* but the abdominal swathe ought to be changed from day to day, so as to give comfort to the patient.

Position of Patient in Bed.—As regards the position of the patient, I am in favour of the dorsal one for the first few days, and even longer than this in vaginal hysterectomy. It is both on clinical and anatomical grounds the safest, but she may be permitted to turn on her side and vary the posture after this. There is nothing then to be gained by enforcing the dorsal position to the discomfort of the patient, as this only contributes to restlessness.

Thirst and Vomiting.—Thirst, if not excessive, is met by repeated sips of water and small quantities of iced lemonade, with a few drops of dilute phosphoric acid added. Ice by itself is better avoided. If the thirst should prove excessive, the proper plan to adopt is that of Clark,* namely, the administration of a large saline enema into the rectum. Clark and Howard Kelly administer the saline under an anæsthetic. If it be given as a preventive, it must be used at the close of the operation while the patient is still on the table. Not only is thirst alleviated, but vesical irritability is prevented, and the specific gravity of the urine is lowered. The amount of fluid given by the mouth must, of course, be increased. Greig Smith, remarking on the vomiting of peritonitis, says it 'is not of a sort to be controlled by medicine; indeed, it is doubtful if it be desirable to check it.' The vomiting, as he points out, frequently relieves the distended bowel of its liquid and gas.

* *American Journal of Obstetrics*, vol. xxxiv., No. 2.

He found 'the administration of as much fluid as the patient will drink—soda-water, weak tea, or simple warm water—is followed by the evacuation of bilious fluid and gas, making the patient comfortable in a few hours;' and Kussmaul's treatment of washing out the stomach has given him, on a few occasions, good results.

More harm than good is generally done by the drugs to check vomiting, and the safest course to adopt when sickness begins and does not yield to ordinary remedies is to resort at once to rectal feeding, and to employ lavage of the stomach, especially if the vomited matter be dark or black in colour. I find, in mild cases, an effervescing mixture, made by placing a powder of carbonate of soda with carbonate of bismuth in a mixture of citric acid or lemon juice, with the liquor bismuthi, is often effectual in checking the nausea. Iced champagne given in small quantities frequently is also of service, and a sinapism may be laid over the epigastrium. In these cases of protracted vomiting, peptonized milk, alternated with beef-tea, is the best medium for rectal enemata.

Post-operative Complications: Peritonitis—Different forms of: Traumatic; Septic. Obstruction of Bowel; Ileus.—In the various forms of peritonitis, whether of the ordinary traumatic or plastic kind, or that due to septic infection, with its consequent septicæmia, we have to deal with the most anxious and alarming post-operative conditions that follow upon laparotomy or vaginal cœliotomy. There is a train of symptoms which, when they occur, leave little doubt as to the dangerous complication we have to fear and treat. These are: some swelling in the epigastric region attended by pain; the pulse becomes more rapid, is altered in character, feeling less compressible and gradually becoming harder; the temperature rises, at first a degree or two, and then becomes more elevated, with some fluctuations; the patient grows restless, the facial expression is somewhat anxious, there is pallor of the countenance. These symptoms may take some time to develop, or they may progress with alarming rapidity. According to their relative degree of severity we have an indication of the danger to which the patient is exposed.

As simple peritonitis is the least dangerous form, and frequently with treatment subsides, the pain lessening, the temperature receding, the pulse softening and decreasing in rapidity, it becomes a matter of great importance to note those signs and symptoms which assist us in differentiating the causes of post-operative peritonitis.

If there be localized peritonitis setting in after the operation,

and occlusion or strangulation of a distant part of the intestine be the consequence, the presence of meteorismus of the strangled loop of intestine which is recognizable to the view, and can be defined by palpation or percussion (Wahl.), together with peristalsis of the intestine, limited to the obstructed portion of the bowel, are important signs (Schlange).

Such localized peritonitis is generally of the traumatic character, and this form has not, as a rule, attending it the graver symptoms found in true obstruction or in septic peritonitis. Still, it must be remembered that such traumatic inflammation and exudation are frequently the forerunners of graver states, and may in themselves lead to strangulation of the bowel and complicate ileus. We have, however, early warning in the rapidity with which the symptoms follow the operation, the severity of the pain, the comparatively slight elevation of temperature, the general aspect of the patient indicating no profound systemic change, more especially in the absence of excessive vomiting and extreme rapidity of pulse. If sepsis be the cause of the peritonitis, and we have to face that most dreaded of all operative states, septic peritonitis, the train of symptoms are generally unmistakable. In this case all the usual evidences of peritonitis are accentuated; though it does not set in so early as in the case of the simpler form, there is an alarmingly rapid development of symptoms, pointing generally to a fatal issue. We may summarize these thus: great increase of anxiety on the part of the patient as to her condition; pain, at first extreme, possibly not continuous, and becoming less as the fatal issue approaches; uncontrollable vomiting, at first of the contents of the stomach, then of a greenish or dirty-coloured fluid, finally dark-coloured or almost black; considerable tympanitic distension, though cases do occur in which the intensity of the poison appears to be so great that neither is there pain nor any considerable tympanites.

The condition of the mind varies. In some it remains quite clear, and there is no delirium, or it is very slight. In others delirium is constantly present. The temperature reaches to 104° or 105° Fahr.; and the pulse, becoming more rapid, ranges from 130° to 140° or more. This is characteristic septic peritonitis.

If there be septic intoxication as a consequence of the peritonitis, the patient may suffer from pyæmic conditions, as abscesses, pleurisy, pleuro-pneumonia, pericarditis, and endocarditis.

Ileus.—Should we have to deal with a strangulation due to any

cause and resulting ileus, we are assisted in our diagnosis by the more paroxysmal nature of the pains and the usual signs and symptoms of ileus, such as the peristaltic contractions of the bowel, the tendency to collapse which follows these, and the difficulty or impossibility of obtaining a motion. Such griping or colicky pains are quickly followed by nausea, vomiting, and tympanites, and if there be no relief the patient dies with all the usual symptoms of strangulation, with possible gangrene of the intestine or omentum. Should the ileus remain unrelieved for any time, the symptoms merging into those of general peritonitis, it is most difficult to distinguish between the two affections.

Prophylaxis.—The surgeon who does not realize that the causes of any form of peritonitis following operation are most likely to be found in some want of precaution or operative defect on his or a nurse's part during its performance, at any rate in such a large proportion of cases that the exceptions are not worth considering, is hopeless. It is necessary to epitomize these prophylactic points in the performance of an operation, the observance of which will considerably minimize the consequent risks of peritonitis.

(*a*) The closest attention to aseptic details.

(*b*) Careful protection of the bowel, with as little injury or handling of it as possible.

(*c*) Cautious freeing of intestinal adhesions, whether inter-intestinal or intra-pelvic.

(*d*) Avoidance of strangulation of the omentum by sutures or ligatures, and patient replacement of it before closing the abdominal wound.

(*e*) Perfect adaptation of the peritoneal edges, and the covering by it of all denuded surfaces.

(*f*) Effective drainage in suitable cases.

(*g*) Avoidance of the necessity for prolonged anæthesia by as great rapidity of operation as is consistent with the complete arrest of hæmorrhage and attention to the foregoing details.

Such care will in the majority of cases obviate the necessity for a drainage tube, in itself a potent source of peritoneal complications.

Fritsch lays special stress on those cases in which the physiological functions of the peritoneum are interfered with, and attributes the early onset of dangerous symptoms which occur without rise of temperature before the second day to this cause. The early symptoms of tympanites, dry tongue, and rapid circulation are characteristic of this class of case. The temperature does

not rise until the second day, and the patient does not die because she is septic, but she becomes septic because she is dying.*

Intestinal Obstruction and Ileus.—Uhlman noticed in Zweifel's clinic that adhesions were never found between coils of intestine, save in parts which had been denuded of peritoneum. Paroxysmal pain, arrest of the peristaltic action of the intestine, cold perspiration, absence of flatulent expulsion by the bowel, are some of the most pronounced of the early symptoms of ileus. Smyly advocates early reopening of the abdomen should the ordinary means of treatment of the obstructed bowel not succeed.

Martin of Birmingham thus tabulates the causes of intestinal obstruction :—

(1) Inclusion of intestine between the lips of the abdominal wound.

(2) Transfixion of intestine while suturing the wound.

(3) Constriction of the rectum by utero-sacral folds, when there is much tension on the stump after hysterectomy.

(4) Annular constriction of the rectum by a hæmatocele.

(5) Paresis of the bowel from atony and flatulent distension in a feeble woman after removal of a large ovarian tumour.

(6) Paresis due to peritonitis.

(7) Secondary obstruction—(*a*) due to adhesion of a coil of intestine to a raw surface, such as the cut surface of a pedicle, left at the close of operation; (*b*) due to matting of intestines after peritonitis.

It must ever be a matter for the gravest consideration whether or not the abdomen should be opened when symptoms of peritonitis or what appear to be those of septic peritonitis or ileus are present. In the first place, much will depend upon the nature of the operation; the conditions found during its performance; the presence of secretions, whether of serum or pus; and the probability of post-operative adhesions having formed. Secondly, on the determination as to the nature of the peritonitis, and the view that obstruction, if present, is due to strangulation. Thirdly, where signs generally point to the presence of ileus. Fourthly, the occurrence of intra-peritoneal hæmorrhage, whether sudden or slow. Here the usual evidences of internal hæmorrhage, in pallor, the thin and compressible pulse, general restlessness and distress, are sufficiently indicative of this accident, leaving the surgeon no choice but to operate at once.

When peritoneal complications declare themselves, the first essential point is to secure free action of the bowel. I prefer small

* See chapter on Ovariotomy for Ovarian Cystoma.

doses of calomel given every hour for four or five doses. At the end of this time a saline purgative is administered, unless we are uncertain of its tolerance by the stomach, when an enema is substituted for it. Here, again, where there is nausea or tendency to vomiting, we had better solely rely on rectal feeding.

A portion of spongio-piline large enough to cover the abdomen is prepared with sufficient protective. A lanolated cream of oleate of mercury with morphia, extract of belladonna, and turpentine, diluted with lard, is spread on a piece of old muslin, and this is laid over the abdominal wall. The spongio-piline is now wrung out of very hot water, placed over the muslin, and the whole covered with the protective. The spongio-piline is renewed every three hours, or the latter may be used as an ordinary stupe with some laudanum or turpentine sprinkled upon it. Should it be a case in which drainage has been employed and there is any apprehension of septic infection, the drain should be removed immediately, and the wound examined.

Examination of the Wound, and Exploration of the Abdomen and Pelvis.

Should this show signs of inflammation and suppuration, it must be immediately re-opened, thoroughly cleansed with weak formalin solution, and fresh drainage (if such has been used) resorted to. It may be necessary in urgent cases, where we fear septic intoxication and the symptoms point to septic absorption (especially should any complication have occurred during operation to justify a suspicion of consequent sepsis), to open the wound at once and examine it. The bowel in contact with it is examined, and the intestine is carefully covered with hot sterilized cloths. When the bowel has been pushed aside, the pelvic cavity, the stump of the cervix if myo-hysterectomy has been performed, and the pouch of Douglas, are all explored, and, should it be necessary, the pelvis is flushed out with warm sterilized saline solution. The strength has to be maintained by stimulating or by nutriment enemata, with sufficient stimulant given by the mouth.

In some cases, having thoroughly disinfected and cleansed the pelvic cavity, the lower portion of the wound is left open, the pelvis is loosely packed with sterilized iodoform gauze, and a piece is allowed to protrude from the lower end of the abdominal wound to serve as a drain. In these post-operative procedures, chloroform is the best anæsthetic to select. In the production of ileus we must not forget the part taken by the Trendelenburg position, as, owing

to the falling down of the intestines, a loop may pass through an opening in the omentum, and this lead to strangulation. Should we suspect that ileus has supervened, and that there is associated obstruction, there can be no doubt that calomel is the sheet anchor; and here a dose of five grains may be placed on the tongue, followed by the administration of a large enema. Should this latter return, and no motion follow, and the stomach will tolerate it, sulphate of magnesia, given as we have already indicated, is the best saline purgative under the circumstances. If the symptoms persist, especially if there be recurrence of severe pain and persistent vomiting, the abdomen must be opened, and the site of the strictured bowel be sought. Adhesions of coils of bowel to each other or to the stump should be looked for, and these must be gently separated, and in the most delicate manner, any tear being at once repaired with fine silk sutures. Any intestinal injury caused in the reduction of the obstruction should be immediately closed, and perfect cleanliness of the abdominal wound secured.

When the area of the suppuration in the wound is limited, and stitch abscesses occur, these sutures should be immediately removed, and any pus which has formed be allowed to escape. The wound is then carefully washed with perchloride or weak formalin solution. A small iodoform drain is placed in the opening, and the aseptic dressings are reapplied.

In cases in which, with drainage, any odour is perceived on withdrawing the drain, or if on examination of a sinus any fœtid discharge makes its appearance, a long sinus-forceps, holding a strip of gauze wet with formalin solution, should be carried to the bottom of the sinus, which is then wiped out, and this may be repeated a few times until the gauze returns clean and sweet; or a sinus-syringe may be inserted, and the canal washed out with the formalin solution. Should, however, this not succeed in disinfecting the track, the opening must be enlarged and proper drainage secured.

In searching for the source of obstruction in ileus, or in the manipulation of adhesions, every antiseptic and aseptic precaution has to be taken, and the abdomen and wound thoroughly disinfected before the sutures are removed. The temperature of the room in which the operation is performed should be over 70°. Every preparation must be made to protect and keep the bowel warm, the table on which the patient is placed should be heated or covered with hot blankets and hot water-bottles be ready for the feet; and then,

commencing at the ileo-cœcal valve, the search is continued until the limit between the dilated and collapsed portion of intestine is reached. Then the adhesion is separated, or any band is divided, the bowel returned, and the abdomen is closed with all the usual precautions.

Injuries to the bladder and ureter, with resulting complications, require special management, according to the extent and character of the rent and its situation. These matters are dealt with in the chapter on the Bladder and Ureters.

Secondary Hæmorrhage.

This, probably the most serious of all post-operative conditions, has as its commonest cause the slipping of a ligature, or it may come from too hasty and ineffectual hæmostasis. Neglect in thoroughly securing the pedicle of a tumour, and its severance too close to the ligature, are other sources of secondary bleeding. Some surgeons affect to despise that bleeding, which is said to be '*only an oozing*,' but which, if we carefully staunch the surface and watch the source from which the blood comes, we shall generally find is due to one or two small vessels which have escaped torsion or ligature.

It is the complete control of all bleeding that stamps the operation as being perfectly and safely finished.

The recognition of these facts by surgeons, added to the growing determination not to sacrifice the safety of a patient at the cost of a little extra time devoted to the arrest of all bleeding, has lessened in recent years the occurrence of secondary hæmorrhage.

There can be little doubt that in the ligature of vessels most surgeons prefer silk to catgut. It is less likely to loosen or slip, though this defect, to a certain extent, depends upon the character of the gut. Howard Kelly recommends that all large vessels, such as the ovarian or uterine, should be tied first with silk, and then the open mouths caught and tied with catgut. It is much safer not to trust to mere torsion or compression with ordinary hæmostatic forceps in abdominal operations.

Symptoms.—In their relative order the following are the most striking evidences of hæmorrhage: There is a sudden change in the patient's condition, her countenance becoming more anxious with commencing restlessness. This latter symptom quickly increases, the patient throwing her arms about as well as her legs. The

pulse suddenly increases in rapidity, is weak, compressible, or fluttering. The respirations also increase and become gasping. The pallor of the countenance, the coldness of the extremities, and the clammy skin complete a group of symptoms which, when followed by a subnormal temperature, are unmistakable.

Treatment.—In the face of such symtoms there is but one course to pursue: the abdomen has to be reopened, the source of the hæmorrhage sought for, and the bleeding vessel or vessels secured. But before this is done, temporary means must be at once adopted. These consist of a subcutaneous injection of strychnine, and the administration of brandy by the rectum, this being repeated within a short time and immediately before the operation is commenced. In such cases time is of the utmost value, so that it must not be lost in too elaborate preparations.

Every possible preparation is made to maintain the body temperature during and after the operation, and while these are being carried out, the surgeon and assistant will as speedily as possible disinfect the hands. The wound is opened from below, two or more sutures are divided, and the margins of the abdominal wound having been separated, the peritoneum is caught well up with catch forceps and opened.

Immediately, the blood makes its appearance in the wound, and simultaneously two fingers are carried down into the pelvis. If the operation has been a salpingo-oöphorectomy, the uterus will be a guide to direct the finger to the side from which the bleeding has occurred. If the ligature has slipped, both broad ligaments have to be exposed, sponges being used to remove the blood, and temporary clamps are placed both on the cornu of the uterus and on the outer extremity of the broad ligament. This having been done, and the cause of the bleeding been successfully met, the ovarian vessels are secured and the broad ligament is again carefully ligated. In a case of panhysterectomy, the pelvic cavity may have to be explored, the blood staunched as far as possible after temporary clamping of the broad ligaments, and any bleeding points searched for. Here, again, both uterine and ovarian arteries are secured, and fresh ligatures are placed on the broad ligaments. If the operation has been that of myo-hysterectomy, the cervical stump is seized and pulled well up towards the abdominal opening, so that it may be inspected, and, if the hæmorrhage proceed from it, a ligature is passed below the bleeding point, and the vessel is thus secured. The abdominal wall is closed, and it is better to lose no time by separate adaptation of

the parietal layers, but to close the wound rapidly by passing gut, sterilized silk, or silkworm-gut sutures through the entire parietes. The patient is now removed to the warm bed which has been prepared for her, the foot of which has been elevated, and a submammary injection of artificial serum is given, with one of brandy into the bowel. If the patient be very collapsed, these had better be administered while she is on the table before removal to bed. When there, a subcutaneous injection of strychnine is given, and this must be continued at intervals, care being taken so as not to produce toxic symptoms from the drug.

High Temperature.—While we may take it as the rule that, excluding the ordinary variations which occur within the first twenty-four hours or so after operation, the aseptic case runs a normal course with but slight deviation, rarely passing above 99°, there are others in which, so far as the wound or the operative tract is concerned, everything is surgically perfect, yet erratic variations happen that it is difficult to account for, and which may cause unnecessary alarm and anxiety. It is mainly in those with a nervous temperament that such a rise of temperature is met, and unquestionably the most unfavourable patients for abdominal operations are those whom we would class as neurotic or hysterical. They are the most sensitive, apprehensive, impatient of pain, difficult to feed, and restless. The very restlessness itself is sufficient to disturb parts, disarrange dressings, elevate the temperature and pulse, upset the digestive functions, and predispose to mischief that otherwise would be avoided. There can be no doubt that temporary pyrexia is caused by blockage of the bowel, want of care in maintaining an even temperature in the room, or in regulating the covering of the patient. It also may be the result of an injudicious visit of a friend or relative, pain, sleeplessness, premature administration of solid food, some vesical derangement, and the toxic effects of iodoform. The temperature rises from irritation in the track of the abdominal wound, the collection of serum in the neighbourhood of the sutures, or threatening of stitch-abscess. On the whole, however, it is always safest to look upon an elevation of temperature as a danger signal, and one not to be neglected. The ranges of peritonitis and septicæmia are unmistakable, though it does occur that an abnormal temperature will sometimes attend upon the course of a perfectly straight surgical convalescence.* A few doses of phenacetin or antipyrin

* I have recently had a striking instance of this. The patient, operated upon for fibromyoma by cœliotomy, for three weeks maintained a pyrexial range,

given in cachets, washed down with an effervescing citrate of potash mixture, is a simple but generally successful method of meeting some rise of temperature which has not any infective origin. A few grains of quinine may be combined in each cachet. A saline purgative and a grain or two of calomel are given, and the bowel is opened. Absolute quiet is secured, and the visit of any friend is prohibited. The elevation of temperature caused by peritonitis, sepsis, or stitch-abscess is treated in the manner described in discussing these complications.

Fæcal Fistula.

If after abdominal or vaginal operations a fæcal fistula should result from injury to the bowel, necrosis from pressure or from slough, the first principle is to keep the fistulous canal isolated as far as possible, while steps are taken to disinfect it. Dressings or tampons that indicate by the odour or discharge that fæcal matter is present must be frequently changed, and the skin round the wound kept scrupulously clean.

If the fistulous opening be on the abdominal wall, a few loops of the ligatures should be divided and the fistula washed out with a weak formalin solution. By injecting a warm saline solution into the rectum, should the fistula have its origin here, the fluid wells up through the abdominal opening, and a long flexible probe passed down the fistula will determine this. Such washings are daily repeated. With a long crochet needle or hook the canal may be searched for any retained ligatures, which then are detached, or if possible, cut.

If despite all such efforts the fistula will not heal, then there only remains the radical operation of cutting down on and isolating the fistulous track, dissecting it out, if possible, and closing the bowel opening by sutures, or enveloping it with a gauze pack, so as to induce the formation of new granulation tissue. An attempt is made at the same time to cover it with peritoneum and adjacent bowel.*

If fæcal matter escape and find its way on to the dressings after a vaginal hysterectomy, the rectum must be kept well cleansed

twice reaching to 102·1°, and attendant on this temperature was a rapid pulse. There were no other symptoms, neither sickness, pain, nor bowel trouble. The recovery was complete, and has remained so. There were no suture complications.

* See Howard Kelly, 'Operative Gynæcology,' vol. ii. p. 123.

with boric acid injections, fæcal accumulations prevented, and the vagina douched four or five times in the day with weak formalin or peroxide of hydrogen solutions. If there be any suspicion of pent-up matter, and that the sutures have not been removed, these

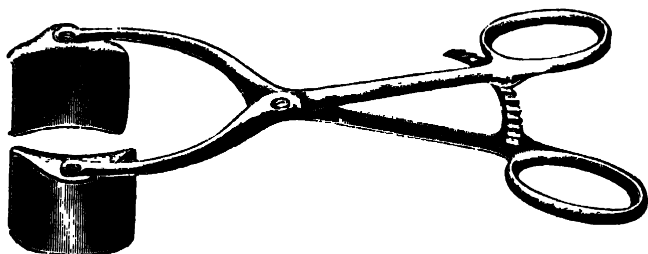


FIG. 431A.—SEGUND'S BIVALVE SELF-RETAINING ABDOMINAL RETRACTOR. The blades are movable.

should be cut and withdrawn. A gauze drain is kept against the opening, and a free vent for any discharge is allowed. Any attempt to close the rectal fistula must be postponed.

CHAPTER XXVII.

TUBERCULOSIS OF THE UTERUS.

Symptomatology.—As the form of tuberculosis met with most frequently in the uterine cervix or fundus is of the nature of a caseous endometritis, which does not present any clinical features distinctive from those present in other cases of chronic endometritis, there is nothing in its symptomatology sufficiently typical to enable us to distinguish it. This specially applies to those cases in which the evidence of tubercle in other organs is absent, and in which the invasion of the uterus by the miliary type of the disease is but part of the general infection. Suspicion may be aroused by the caseous nature of the discharge, which will necessarily be strengthened by the evidence of tubercle elsewhere. Unfortunately, the Fallopian tubes are frequently involved. We shall refer to tubercular disease of the adnexa when dealing with affections of these parts. The time of life in which tubercle of the neck of the uterus is most likely to occur is between the ages of twenty and forty. The spread of the tuberculosis to the adnexa is an admitted fact. Primary tuberculosis of the Fallopian tube I give an example of in dealing with the Fallopian tube. Obviously, to make an early diagnosis of uterine tubercle is of the greatest moment.

There is but one certain means of diagnosis—viz. the microscopic determination of the bacilli.

In dealing with the value of rectal exploration in the case of female children, as urged by Carpenter, reference has already been made to the existence of tubercle in the young child, and Schmorl, Lehmann, Birch-Hirschfeld, and others, have shown that congenital tuberculosis may be due to passage of the tubercle bacilli through the placenta to the organs of the fœtus. The bacilli were found in three cases in the fœtal placenta (*Amer. Med. Surg. Bull.*, March 15, 1895).

Pozzi divides tuberculosis of the uterus into these forms: acute miliary, interstitial, ulcerative.

The first, or *acute miliary tubercle*, is simply a sequence of the general infection of the entire system.

The interstitial is a rare and essentially chronic form, yet it may manifest itself through uterine accidents and injuries, the results of parturition.

The ulcerative type is the most frequent and the most important. In the early stage the diagnosis is most difficult, and the affection simulates chronic endometritis.

Later, special nodules are developed, and in these the giant cells, with the bacilli, are found. Such a condition as that depicted (Fig.



FIG. 432.—TUBERCULOSIS OF THE CERVIX (EXPERIMENTAL). (57 diam.) *a*, villi of the arbor vitæ; *b*, depression between two villi; *c*, tubercular granulation. (After Cornil.)

433) results. There is infiltration of the uterine tissue and caseous degeneration. The cavity of the womb is filled with this mass of tuberculous granulation tissue, the neck frequently remaining intact. The caseous mass breaks down into pus, giving rise to the characteristic purulent discharge of this variety. Cornil has searched in vain for the tubercle bacillus in the degenerated débris of the endometrium. Winter, on the other hand, has found the microbe in tubercle of the neck of the uterus.

Tubercle of the body of the womb is frequently attended by endocervicitis, with considerable muco-purulent secretion. Under

any circumstances, the bacilli found are few in number. So far as diagnosis is concerned, this is most difficult, though it cannot be doubted that tuberculosis is a more frequent histological cause of inflammatory conditions of the uterus and adnexa than is commonly believed.

Paul Petit considers that among other histological appearances the following are characteristic of tuberculous endometritis :—

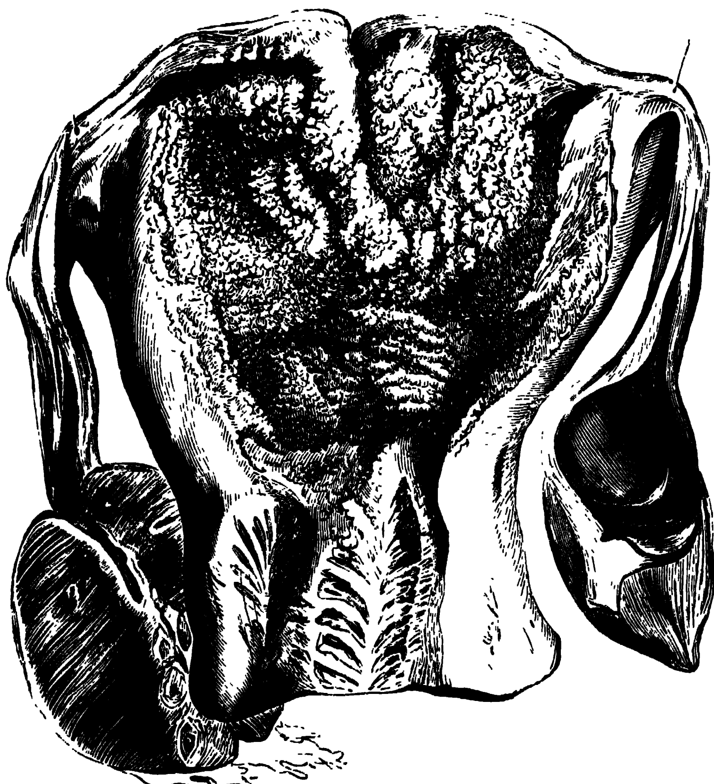


FIG. 433.—TUBERCULAR DISEASE OF THE UTERUS. The cervix unaffected; the Fallopian tubes were filled with tubercular deposit. (Robert Barnes.)

A diffusion of dying or atrophied interstitial cells ; giant cells, in variable numbers ; embryonic nodules which are detached from the stroma developed in the vicinity of the vessels, the lumen of which may or may not be preserved ; numerous changed glands altered in shape, dilated, and with the epithelium lining them elongated or in a state of transformation.

In order to complete the diagnosis, it is necessary to remove a small portion of the tissue with the curette for the purposes of examination.

Conveyance of Infection.—Tuberculosis of the cervix may extend to the vagina, and not involve the Fallopian tubes or ovaries. In such limitation of the infection Emanuel considers that the disease has been primarily conveyed during coitus. The finger may convey the disease, so may the sound or other instrument. The important clinical and prophylactic bearing of this latter fact is obvious.

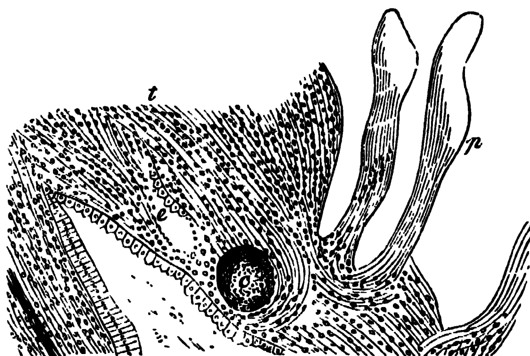


FIG. 434.—EXPERIMENTAL TUBERCULOSIS. *t*, connective tissue, containing numbers of round cells; *c*, giant cell; *p*, papillæ and superficial vegetations; *e*, fissure in tuberculous tissue with epithelial cells similar to those lining a tuberculous follicle. Adjoining this latter is portion of a gland with its epithelial lining, the cells of which are thickened and aggregated (35 diam.). (Cornil.)

Marital intercourse with a consumptive husband is fraught with special danger to the wife. The possibility of his being a cause of direct infection to her can be pressed with emphasis in those sad cases where infatuation and affection, despite remonstrance, still prompt rash determination to marriage, or the husband and wife to occupy the same bed. In cases in which the cervix has been the starting-point of the disease, extensive tuberculosis has been, discovered in the lungs and other organs.

CHAPTER XXVIII.

MALIGNANT GROWTHS AND DEGENERATIONS—DECIDUOMA MALIGNUM.

Malignant Tumour of the Chorionic Villi.—That an affection of the uterus, a description of which, prior to the issue of the last edition of the work, found no place in any gynæcological text-book, should have attracted so much attention, and have caused such frequent discussion, is not a little remarkable. I propose briefly to summarize the pathological and clinical facts connected with a disease which, to the majority of those who have investigated its nature, seems to warrant its being placed in a distinct category by itself amongst the malignant affections of the uterus. Before the discussion at the Obstetrical Society of London (April, 1896), no special attention was drawn to the subject in England, yet in 1889 Sänger distinguished under this title some malignant tumours composed of deciduous or placental elements having special characteristics apart from other uterine neoplasms ('*Zwei aussergewöhnliche Fälle von Abortus*'—'*Ueber Sarcoma uteri deciduo-cellulare*'). And again, in 1893, he drew attention to these deciduo-cellular sarcomas, and other decidual tumours of the uterus. Sänger's observations on the malignant character of these degenerations were followed by those of Pfeiffer, Chiari, Müller, Gottschalk, Schmorl, Kaltenbach, and others. In France, Nové-Josserand, Lacroix, Pavio, Jeannel and Beach, recorded cases in 1893, and an able summary of the subject was written by Maurice Cazin in *La Gynæcologie* (February, 1896).

Maïer, as far back as 1875, published in the *Archives of Virchow* two observations on tumours of the body of the uterus composed of decidual tissue. One of these cases was afterwards shown by Hegar to have died of a malignant affection considered to be cancer of the uterus.

In 1895 Bacon published a case in the *American Journal of Obstetrics*, and in the same year Whitridge Williams recorded another in which there was rapid vulvar metastasis two weeks after labour.

The rapidity of this would appear to have been due to thrombus. Recalling the facts of cases in which certain clinical features answering in every respect to those of malignant deciduoma have occurred to myself, I cannot but think that the want of histological differentiation has been the explanation of the non-recognition of this special malignant type of uterine growth and degeneration. Marchand considers that the deciduoma is of an epithelial nature, and several



FIG. 435.—DECIDUOMA MALIGNUM. (Haultain.) Uterus (full size). Posterior wall split open showing uterine cavity. *d*, new growth on anterior wall; *b*, blood-clot attached to tumour; (*m*) normal uterine mucosa.

authorities are at issue between the strictly decidual source of the growth and its purely sarcomatous character. Maurice Cazin emphasizes as an important histological and differentiating feature of the giant cell area, that there are no inter-filamentous or intercellular connections present. The presence of a large giant cell, resembling the decidual cell of Friedländer, is characteristic of

these deciduous tumours, and they are present in the secondary nodules situated in the surrounding neoplasm, retaining the same type as in the original tumour. This proliferation occurs also in the ovary in the infected cases. In addition to these characteristic giant cells, there is a basis of tissue approaching the sarcomatous form, which invades the other tissues of the organ, into which hæmorrhagic infiltrations occur, and a process of necrosis sets in. Such secondary changes may interfere with the true histological features of the neoplasm. There is no definite arrangement of the cells, neither in size, form, aggregation, nor number, and the appearances are quite distinct from those seen in epitheliomatous



FIG. 436.—GIANT CELLS. (Maurice Cazin.)

growths of a pavement character. With reference, however, to this last point, Marchand regards the growths as distinctly of a carcinomatous nature, having a special relation to the development of the ovum. He believes that the tumours are epithelial, having their origin in the syncytium (uterine epithelial layer of the chorion) and the ectodermic epithelium. Hence he looks upon them as tumours of the serotina. The differentiated protoplasmic masses, cells, and trabecular and retiform tissues, are derived from the syncytium. Molar pregnancies, he considers, favour the production of malignant neoplasms, but he does not believe that the decidual cellules, properly so called, participate in their formation. More recently, Marchand

states that it is a matter of indifference to him whether the new growth is relegated to the sarcomata or carcinomata. Viewing it as a chorion-epithelioma, it is to its origin from the villi of the chorion that he attaches most importance. He regards the growth as epithelial, and formed from the syncytium of the chorionic villi, and the ectodermal elements of Langham's layer of cells, regarding the syncytium as partly of maternal, and partly of fœtal, origin. Marchand separates the two principal types of malignant chorion-epithelioma into typical and atypical. In the typical form chorionic



FIG. 437.—SECTION OF DECIDUOMA MALIGNUM FROM THE CORPUS UTERI, SHOWING THE SARCOMATOUS FORM OF TISSUE. Giant cells and small round cells, without any definite arrangement. In parts the degeneration of the vessels is seen, the lumen limited by the neoplastic tissue itself.

epithelium retains the character of the early pregnancy, in the atypical, the epithelium exists as isolated cells. There are transitional stages. It is the atypical variety that most approaches histologically to sarcomata and carcinomata. He prefers, as the most accurate nomenclature, malignant tumour of the chorionic epithelium.*

The important clinical feature in this affection is the tendency to pulmonary metastases. Newmann, Treub, and others have published cases of this character. Hæmoptysis occurring during early pregnancy,

* *Centralblatt f. Gyn.*, 1898, No. 131; *Zeitschrift f. Geb. u. Gyn.*, 39 : 2.

and subsequent to operation for retained products of conception, or the removal of hydatid moles, must make us apprehensive of such metastases.* Maurice Cazin well insists that it is important not to speak of a deciduoma, when we are simply dealing with an ordinary sarcoma, through confusion between the cells of the latter and those of the former.

Through the uterine wall there is found an invasion of this neoplastic tissue, and quite apart from the giant cells are small round cells of a sarcomatous type. This bed of tissue is traversed by vessels of which the coats have been destroyed, the lumen limited only by the neoplastic tissue itself. This tissue and cell invasion gradually supplants by substitution the normal uterine

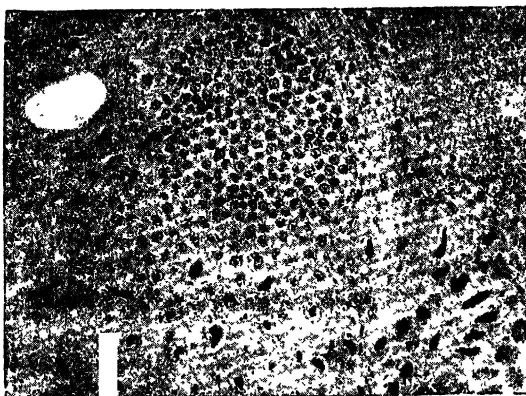


FIG. 438.—SECTION SHOWING GROUPED GIANT CELLS AND PROLIFERATING GROUPS OF CELLS OF A SARCOMATOUS TYPE IN THE NEOPLASTIC ELEMENTS. Such grouping has been mistaken for pavement epithelium. (Cazin.)

wall. But the giant cells are quite distinct from those large cells seen in ordinary sarcoma. The repartition and distribution of these decidual giant cells is very irregular. The consequence of this degeneration is a superficial zone of necrosis, associated with hæmorrhagic infiltration, due to the vascular condition just referred to.

This affords a histological explanation of the characteristic and intermittent hæmorrhages which are a clinical feature of this affection.

Beneath this necrosed zone, near the cavity of the uterus, there

* *Nümchener med. Wochenschrift*, 1898, No. 49, 158.

is the denser neoplasm, which irregularly invades the deeper and sounder tissues. Further removed from it, at the periphery of



FIG. 439.—BRANCHING MULTINUCLEATED PROTOPLASMIC PROCESSES IN FREE BLOOD SPACES. × 400. (Haultain.)



FIG. 440.—(F) NECROTIC AREA—(C) CELLULAR AREA OF ACTIVITY—(V) VILLI. (Haultain.)

the uterus, there is the external bed of normal uterine tissue, of varying thickness according to the extent to which the disease has progressed. Gottschalk gave the name of *choriodeciduoma malignum* to a variety of the disease in which the affected surface presents a villous appearance, somewhat similar to the villosities of the chorion. Hartmann, Toupet, and others, have reported on these cases. The vegetations are vascular, having each a central vessel surrounded by the connective tissue elements. With their rounded expansions in contact one with another, these vegetations form by their connection a neoplastic tissue, which, when they have arrived at their full period of development, has the appearance of a continuous membrane, having a uniform thickness enclosing a limited number of nodules, without any line of demarcation of cellules. Protoplasmic masses are seen forming secondary vegetations, having a larger number of nodules, and provided at their periphery with amorphous granular projections, which are true points of development.

A vascular cavity is found after a time with embryonic elements interposed between the vegetations and the vessel, the coat of which is very thin. The authors referred to regard this neoplastic variety as derived from *the hydatiform mole*, considering it as myxoma of the chorionic villi, rather than as a sarcoma of these structures with an embryonic infiltration, as in the case of deciduoma malignum. It is in these villous forms of deciduoma that the more serious vascular lesions occur, attended by profuse hæmorrhage and venous metastasis. This important histological distinction is thus justified clinically.

Spencer * quotes the cases of Apfelstedt and Aschoff, as well as of Müller. In the former, secondary growths of hydatiform mole were found in the labium and paravaginal tissue, and in the case of the latter a row of cystic tumours. Spencer, regarding the whole clinical and histological features of the disease, looks on it as a malignant affection having an association with, or being consequent upon, pregnancy. Hydatiform mole has been observed in 45 per cent. of the cases.

Gross Appearances.†—Haultain, in a recent report on a case before the British Gynæcological Society, entered fully into the pathology of the affection. He arrives at the conclusion that the researches of recent investigators give much support to the essential epithelial character of the neoplasm, the later published cases of Marchand and Teacher leaving strong testimony on these lines.

* *Quar. Jour. of Medicine*, July, 1896.
† *Brit. Gyn. Jour.*, Aug., 1899.

'Springing from the submucous muscular layers of the uterus, the growth is usually found bulging into the cavity of the organ. At first it is covered by

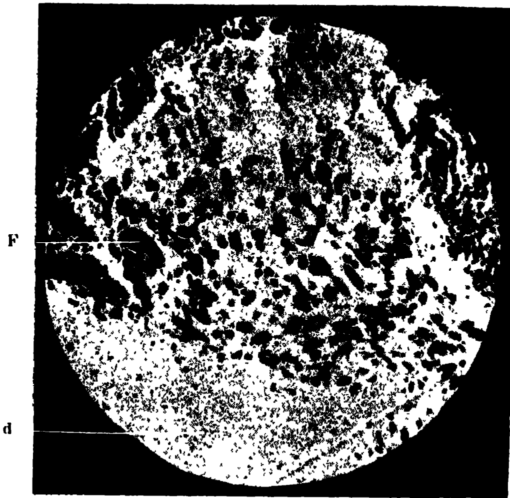


FIG. 441.—UTERINE SCRAPINGS WHICH SHOW (F) NUCLEATED PROTOPLASMIC MASSES AND LARGE ACTIVELY PROLIFERATING MALIGNANT CELLS—(d) FIBRIN. (Haultain.)

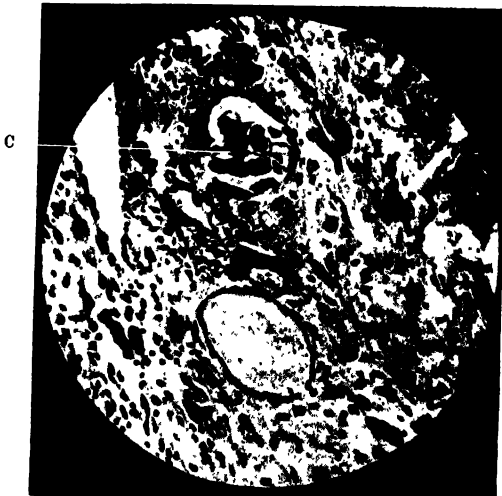


FIG. 442.—AREA OF INVASION. Both varieties of malignant elements (C) in small vessel and surrounding tissues. (Haultain.)

mucous membrane; soon, however, destruction of the mucous covering occurs, and a rough, ulcerated bleeding surface results. On section the main

portion presents a reddish purple appearance not unlike placental tissue, while its deeper layer is of a grey cellular character. Its consistence is soft and spongy.'

Microscopically.—'The seat of active growth is found to consist of cellular elements of two varieties: large polyhedral cells, which stain lightly, and whose large nuclei show a wide intranuclear network; and multinucleated, deeply staining protoplasmic masses, whose nuclei are extremely rich in chromatin and show no wide intranuclear network. The bulk of the tumour, however, is composed of necrosing fibrin, in which may be seen the previously described cells scattered throughout, and undergoing degenerative changes. In early cases there may also be found chorionic villi, whose epithelial coverings are in a state of intense active proliferation, evidently the *fons et origo* of the cellular elements already considered. In the muscular wall of the uterus adjacent to the tumour the cellular elements can be seen infiltrating in all directions,—their line of advance being the small vessels and perivascular lymph spaces. The essential characteristic of the growth is the presence of multinucleated masses of protoplasm which assume all varieties of shape and size, and are probably derived from the syncytial covering of the chorionic villi. These would appear to have a special disposition to migrate into the tissues and perforate the bloodvessels, by the circulation through which they are rapidly borne to the lungs and other organs where the metastases are developed.'

Eden, in discussing Haultain's views, expressed his concurrence in the latest opinion of Veit that the disease was in reality a sarcoma modified by the occurrence of pregnancy. The loops of nucleated protoplasm in Haultain's case were the only structures peculiar to the growth; all others might be found in any rapidly growing sarcoma. The villi being retained, the disease might subsequently invade the part of the uterine wall in which they were situated, and thus their presence be explained.

Origin of the Syncytium.

Williams of Philadelphia, and Salmon of Pennsylvania, after a most careful examination of a Fallopian tube removed from a fatal case of ectopic gestation, with a view to the study of the origin of the syncytium, and its fœtal or maternal origin, have arrived at these conclusions:

When considered as of maternal origin it is supposed to be derived either from the single layer of epithelial cells covering the surface of the endometrium, from the tubal mucosa, or from the endothelial lining of the capillaries, which, according to Minot and Hertwig, dilate enormously to fill the intervillous blood spaces. When considered as of fœtal origin the syncytium is assumed to be a direct derivation of the fœtal ectoderm. From a careful study of the villi in the case at hand, which certainly must be at one of the earliest periods of development obtainable, we are led to draw the following conclusions—

Firstly, that the syncytial cells are not, as claimed by Ruge, derived from

the superficial epithelial cells of the endometrium, as of course they could not be in the present case, since the villi have never been within the cavity of the uterus.

Secondly, that the syncytial cells are not derived from the superficial epithelial cells of the tubal mucosa, since the small villous buds, which cannot possibly have come in contact with the tubal mucosa, show the syncytial layer in greatest perfection. Furthermore, where the fixing villi are in contact with the tubal decidua, not only is there no trace of the epithelium on the surface of the decidual tissue, but also the syncytial layer which covered the end of the villus is absorbed over the area of contact.

Thirdly, it is unreasonable to believe that the syncytial layer is derived from the endothelial coat of the maternal capillaries, because the placenta proper does not form till the third month of pregnancy, and as there is no free blood present about the villi, the placenta cannot yet have been formed, and the intervillous space has not yet been occupied by the expanded capillaries; therefore it is impossible that an endothelial covering should have been cast over the villi.

Not coming from the tubal mucosa or the maternal capillaries the syncytial cells must be of fœtal origin, probably derived directly from the fœtal ectoderm.*

Symptomatology.—The most characteristic symptom is severe intermittent hæmorrhage following upon labour or abortion. The time the bleeding appears after the uterus has been emptied varies. It may occur comparatively soon. In a large proportion of cases, the hæmorrhage, having continued for a time, is attended by the discharge of a hydatid mole. Fœtor of the discharge is frequently present. Metrorrhagia, and foul-smelling, dirty-coloured watery losses, frequently last after the hæmorrhage ceases, or when the uterine cavity has been curetted. Associated with these local signs there is a general cachexia, and a falling off in the health of the patient, who gradually becomes anæmic. On making a local examination, the body of the uterus will be found more or less enlarged, movable, or fixed by perimetric adhesions. In the adnexa, if affected, secondary nodules project which have a smooth feel. The cervix may be open, admitting the introduction of a finger, but more frequently it is closed. Bimanual examination gives but little information. By means of laminaria the uterine cavity may be explored, and soft vegetating masses, or possibly ordinary coagula, discovered. Cazin says that what appear coagula are often in reality neoplastic masses into which blood has infiltrated. The facility with which the finger of the explorer may pass through the uterine wall and perforate the uterus has to be remembered.

* Macan, *British Gynæcological Journal*, 1899, p. 591, *et seq.*

But the crucial test must be applied by a histological examination of portions of tissue removed in exploration from the uterine cavity. I have thus briefly, and without bias, placed the views of the Continental authorities I have mentioned on record, and I purposely append to this chapter a bibliographical list of the contributions which have appeared on the subject.

Differential Diagnosis.—When we come to the grounds of a distinctive differential diagnosis of the disease, so far as its clinical features are concerned, we find that, save in the history of the case and its etiology, we have not many reliable data. True, a large proportion of the cases recorded—fully half—suffered when comparatively young; that is, before thirty years of age. Also the character of the hæmorrhage, and its association with labour or an abortion, may rouse our suspicions, while the appearance of a hydatiform mole may confirm these. But the other signs and symptoms, and even the hæmorrhage, are common to carcinoma and sarcoma of the uterus, while both of these diseases may occur in connection with the consequences of conception. At the meeting of the Obstetrical Society of London, opinion was much divided on the subject, when Spencer and Rutherford Morrison both recorded cases, and Eden combated the view of the decidual origin of the disease. It would be better to accept no case as such which is not clearly identified histologically as associated with conception and its products. One good, at least, will result from the recognition of this relationship: it will help to prevent that 'masterly inactivity' so often assumed in the face of grave hæmorrhage and persistent discharge from the uterus after abortion and labour. It will give an increased importance to the occurrence of molar pregnancy, and the presence of hydatids in the uterus. On the whole, this new addition to gynæcological nomenclature must tend to greater accuracy in the differentiation and classification of malignant affections of the uterus.

Treatment.—In view of what has been said of the nature and rapidity of the development and spread of the disease, pan-vaginal hysterectomy, with total ablation of the annexa, is the only course to advise.

Bibliographical References.

I am indebted to Articles by Walter Swayne (Bristol, Med. Chi. Jour., June, 1896), and Maurice Cazin (*La Gynæcologie*, February, 1896), for these references to the earlier literature of the subject.

Zahn: Ueber einen Fall von Perforation der Uternswandung durch einen Placentarpolypen. *Virchow's Archiv.*, Bd. xcvi.

Meyer: *Arch. f. Gyn.*, Bd. xxxiii.

Von Kahlden: Ueber destruirende Placentarpolypen. *Centralbl. Allgem. Path. und Path. Anat.*, Bd. ii., Nos. 1, 2.

Sänger: Zwei aussergewöhnliche Fälle von Abortus. *Centralbl. f. Gyn.*, Bd. xiii., 1889.

Sänger: Ueber Deciduome. *Verhandl. der Deutschen Gesellsch. f. Gyn.*, Bd. iv., p. 333.—Ueber Sarcoma uteri deciduo-cellulare. *Arch. f. Gyn.*, Bd. lxiv.

Löhlein: Sarcoma deciduo-cellulare nach vorausgegangenem Myxoma Chorii. *Centralbl. f. Gyn.*, 1893, p. 297.

Köttnitz: Ueber chorio-deciduale Tumoren malignem Charakters. *Deut. Med. Woch.*, 1893, p. 497.

Nové-Josserand et Jacroix: *Ann. de Gyn. et d'Obst.*, 1894, t. xvi.

Paviot: *Ann. de Gyn. et d'Obst.*, 1894, t. xli., p. 306.

Jeannel, Congrès Français de Chirurgie, 1894.

Hartmann et Toupet: *C. R. de la Soc. Anat. de Paris*, Octobre, 1894.—*Ann. de Gyn. et d'Obst.*, 1894.

Klein: *Archiv. f. Gyn.*, 1894, Bd. xlii., p. 243.

Bacon: A Case of Deciduoma Malignum. *American Journal of Obstetrics and Diseases of Women and Children*, 1895.

Whitridge Williams: *Arch. f. Gynaek.*, 1888, xxxiii. 53.—*Am. Gyn. and Obs. Jour.*, June, 1895; *Am. Jour. Obst.*, xxix. 721.

Marchand: *Monatssch. f. Geburtsh. u. Gyn.*, 1895, Bd. i.

Kossman: Das Carcinoma syncytiale uteri. *Monatssch. f. Geburtsh. und Gyn.*, Bd. ii., H. 2.—Discussion in *Zeitsch. f. Geburtsh. und Gyn.*, Bd. xxxiii., H. 2.

Carl Ruge: Ueber das *Deciduoma malignum* in der Gynäkologie (*Verhandl. der Gesellsch. f. Geburtsh. u. Gyn.*). *Zeitsch. f. Geburtsh. und Gyn.*, 1895, xxxiii., Heft 1, p. 152.

Pestalozza: *Arch. f. Gynaek.*, 1890, xxxvii. 251, and 1894, xlvi. 1.—*Berl. Klin. Woch.*, 1893, xxx.

Pfeiffer: *Prag. Med. Woch.*, 1890, xv. 327.

Fränkel: *Arch. f. Gynaek.*, 1895, xlviii. 80.

Bacon: *Am. Jour. Obst.*, 1895, xxxi. 679.

Menge: *Zeitsch. f. Geburtsh. u. Gyn.*, 1894, xxx. 323.

Löhlein: *Centralbl. f. Gyn.*, 1893, xvii. 297.

Klien: *Arch. f. Gyn.*, 1894, xlvii. 243, 705.

Nové-Josserand and Lacroix, *Ann. de Gyn. et d'Obst.*, 1894, xli. 109, 216, 317.

Tannen: *Arch. f. Gynaek.*, 1895, xlix. 94.

Eden: *Tr. Obst. Soc. Lond.*, 1896, xxxvii. 205.

Geburtsh. u. Gyn., 1896, i.; abstract in *Med. Chron.*, 1896, N.S., iv. 210.

Kuppenheim: *Centralbl. f. Gyn.*, 1895, xix. 916.

Schmorl: *Die Allgemeine Pathologie*, 1889, ii. 612.—*Centralbl. f. Gyn.* 1893, xvii. 169.

Pathologisch-anatomische Untersuchungen ueber Puerperal-Eklampsie, 1893.

Rutherford Morrison: *Brit. Med. Jour.*, 1896, i. 976.

Spencer: *Brit. Med. Jour.*, 1896, i. 976.

Spencer: *Quart. Jour. Med.*, July, 1896.

Additional References since 1896.

Chrobak: *Cent. für Gyn.*, 1896, p. 1281.

Cock: *Brit. Med. Journ.*, 1896, p. 1819.

Doorman: *Veit. Handbuch v. Gynëk.*, p. 583.

Fraenkel: *Archiv. f. Gyn.*, vol. xlviii., p. 80; vol. xlix., p. 481; vol. lv., Hft. 2.

Franqué: *Zeits. f. Geb. u. Gyn.*, 1896, xxiv., Hft. 2.

Freund: *Zeits. f. Geb. u. Gyn.*, 1896, xxiv., Hft. 2.

Gebhardt: *Zeitschrift*, 37, p. 480.

Götze: *Cent. f. Gyn.*, 1896, p. 699.

Hellier: *Lond. Obstet. Trans.*, 1898, p. 113.

Hollerman (Kiermann): *Diss. in Leiden*, 1897.

Imasousky: *Vralschevina Tapisky*, 1897.

Kelly and Teacher: *Journ. Path. and Bact.*, October, 1898.

Kœtnittz: *Deut. Med. Woch.*, 1893, p. 497.

Kosner: *Monatsch. f. Geb.*, 1897, vol. vi., p. 542.

Lindfors: *Cent. f. Gyn.*, 1897, p. 6.

Lonnberg and Mannheimer: *Cent. f. Gyn.*, 1896, p. [illegible]

Malcolm: *Lond. Obstet. Trans.*, 1896, p. 125.

Marchand: *Berlin med. Wochen.*, 1898, p. 11.

Morison: *Lond. Obstet. Trans.*, 1896, p. 130.

Müller: *Verhandl. d. Deutsch. Gesell. f. Gyn., IV. Congress*, p. 341.

Newman: *Cent. f. Gyn.*, 1896, pp. 1225 & 1233; *Monats. f. Geb. u. Gyn.*, vol. iii., Hft. 5, p. 387; vol. vi., p. 17.

Pestalozza: *Cent. f. Gyn*, 1896, p 175.

Pfeiffer: *Praeger Med. Woch.*, 1890, No. 26.

Resnielli: *Gaz. des Hôp. de Méd. et de Chir.*, 1896, No. 29.

Schauta: *Cent. f. Gyn.*, 1895, p. 248; 1897, p. 53.

Ulesko Strogariowa: *Centralb.*, 1897, No. 15.

Veit: *Handbuch. f. Gynækol.*, 1899.

Vestberg: *Hygeia*, 1896.

CHAPTER XXIX.

CANCER OF THE UTERUS.

CANCER of the uterus may be CORPOREAL or CERVICAL. The old classification into *medullary*, *epithelioma*, and *scirrhus* has still its clinical significance. Some authors separate *cancer of the portio vaginalis* from cancer of the cervix. Carcinoma may complicate myoma either in the cervix, invading here the myoma or occurring independently of it, or it may invade the fundal tumour pushing on into its substance. Various other forms of malignant disease may occur, both in the cervix and body of the uterus—such as *malignant adenoma*, *sarcoma*, *myo-sarcoma*, *adeno-sarcoma*. There are also certain types of *papilloma* which are associated with the benign and malignant growths: for example, papillary *adeno sarcoma* and papillary cysto-adeno sarcoma. In fact, papillary outgrowths of a cartilaginous, myxomatous, and adeno-myxomatous nature have been recorded (Mundé, Thiede, Winckel) which were of the malignant type.

Malignant Adenoma of Cervical Glands.—Alfred Smith reported a case of malignant adenoma of the cervical glands. The uterus was removed by vaginal hysterectomy. The recovery was uninterrupted. 'Malignant adenoma of cervical glands is, according to C. Gebherd,* extremely rare; he can only find a record of six cases. Ruge and Veit † say that cases of adenoma in the pure form are seldom met with, and Bröse ‡ agrees with them also in the extreme rarity of this affection. Smith's specimen microscopically showed the upper portion of the cervical canal greatly distended and excavated. The lower portion was apparently normal. The microscopic section showed a columnar cell epithelioma.' §

Russell of Baltimore has made some valuable researches on the relationship of cancer to the uterine vascular supply and the lymphatic distribution: his results are best stated in the form of a table.

* *Zeitsch. f. Geburtsh. u. Gyn.*, bd. xxxiii., heft 3, 1895. † *Idem.*, 170.
‡ *Idem.*, 134. § Taken from *Medical Press and Circular*, 1895.

GROUP I.—Uterine artery and branches with the accompanying lymphatics.	Cervix and vagina—upper third.	Glands found in the parametrium at broad ligament bases. Glands found at dividing points of iliac vessels.
GROUP. II.—Ovarian arteries and branches with its lymphatics.	Body of uterus and upper portion of broad ligament.	Lumbar glands.
GROUP. III.—Vessels of uterine cornu.	Round ligament; cornu of uterus.	Inguinal glands.

These groups mark the limits beyond which, if the lymphatics are invaded, any prospect of recovery by removal is lost.

Cancer of the portio vaginalis is in the early stage a superficial growth, but the invasion of the cancer elements can be traced for an inch or more by the microscope deeper than the macroscopical features can be recognized. The special danger to the bladder arises from the lateral direction taken by the growth in the cervix, and thus the early invasion of the parametrium. The value of early hysterectomy is thus seen, as isolated nodules of carcinoma may be deposited in the cavity above the internal os. If there be primary carcinoma of the body there is the danger of extension to the cervix, to the peritoneum, through the groups of lymphatics above named, to the broad ligaments, Fallopian tubes, and round ligaments. Happily the tendency is to slow extension outside the corporeal wall.

Two points of vital practical moment have to be recognized. First, that most extensive disease of the entire uterine mucosa and parenchyma may exist without any involvement of the structures beyond. Secondly, that the carcimona of the portio-vaginalis spreads slowly, and that an enlarged lymphatic does not necessarily mean metastatic invasion. Add to these pathological facts that of the dangerous spread of malignant adenoma of the cervix if it be not early recognized, and we can see the force of the indication for complete removal of the organ in the first stages of malignant disease. Furneaux Jordan thus epitomizes the conclusions to be drawn from Russell's investigations.*

(1) In cancer of the portio vaginalis, if the case be suitable for operative treatment, a wide removal of the vagina is indicated.

(2) If the local extirpation be complete the prognosis is good.

(3) Growths of the cervix are usually adeno-carcinomata and are

* *American Journal of Obstetrics and Diseases of Women and Children*, Dec., 1896.

most malignant. The parametrium should be removed as completely as possible.

(4) Adeno-carcinomata of the body are most accessible to operative procedure and give the most favourable prognosis.

(5) Hysterectomy for cancer of the body should include wide removal of broad ligaments, tubes, ovaries, and round ligaments.

(6) The pelvic glands should be enucleated if possible.

(7) Every precaution should be taken to avoid implanting cancer cells on raw surfaces.

Mary Dixon Jones examined critically a cancerous tumour in the pelvic floor attached to the left ovary and tube. The right appendages were also diseased. The entire pathological condition was consequent upon old-standing perimetric trouble. Commenting on the source of this cancerous development, she remarks that there is no normal epithelial structure present, as stated by Waldeyer and Thiersch to be necessary for the development of cancer. Remarking on the presence of columnar epithelium in the gland-like formations seen in these sections, she says: 'The "adenoid variety" is conspicuous by epithelial nests hollowed out in their centre into more or less regular cavities typical of glandular tissue (Fig. 443). The epithelia become columnar, being attached at the apices by narrow feet to the surrounding layer of connective tissue. Thus are produced convoluted tubular formations of the subjacent connecting tissue and lining epithelium. Still further magnified globular and irregular secondary formations are found in the epithelia, supposed to be parasitic.' These formations are consequent upon active proliferation of the epithelia (Virchow), and tend to new formations. In the infiltration of the connective tissue with granules and globules, and this 'inflammatory proliferation' adjacent to the cancer nests, we see the gradual reduction of the new growth to its embryonal or medullary condition. Inflammatory corpuscles shape themselves into cancer epithelia, and the medullary corpuscles form cancer nests. In fact (Heitzmann), the 'small cellular infiltration' (Fig. 444) is the fore stage of cancer.' Such infiltration is a sure means of prognosis of return of cancer in the spot.

'It is the chief zone of local recurrences after extirpation.' No longer can the presence of cells be regarded as essential to proliferation, and we must seek in the fibrous basis substance for the transformation into protoplasm. In it are generated the cancer epithelia. Further microscopical investigation in this case showed the following points of pathological interest: (1) Rows of cancer cells in the lymph vessels, dilated by and carrying these; (2) thrombosis by the cancer epithelia of the true lymph vessels (Fig. 445); secondary changes in the vicinity of the invaded lymphatics; (4) degenerating changes in the lymph vessels, walls, and adjacent connective tissue. Thus, the spreading of the cancer by the lymph vessels is established.

'Under a power of twelve hundred diameters marvellous changes take place in the cancer nuclei. They become coarsely granular, undergo division into smaller pieces of protoplasm, or, as some say, there is a "wild evolution of cells." Thus, the nuclei break up into a number of irregular lumps of living

matter, each one becoming an active centre of infection. They invade the lining endothelia of the lymph vessels. These endothelia become enlarged, filled with granular matter, and also undergo paryokinetic division. Changes take place in the wall of the lymph vessels, they melt away, and the cancer passes into new fields, taking possession of new and larger territories, still growing and spreading. Under the microscope the tissues around the lymph vessel were found filled with cancer epithelia; even the fibrous connective tissue surrounding the thrombus was in a state of active proliferation. The part played in the etiology of cancer by the parasitic coccidia is still a matter of dispute, some, as Dumaire, denying their parasitic nature and ascribing the presence of the pseudo-coccidia to transitional changes in the epithelial tissues. This would disprove the pathological researches of Wickham and others, who attribute to psoro-sperms the epidermal growths in certain forms of carcinoma.

Bearing on this case of Mary Dixon Jones, I may cite one of a mammary tumour I removed for suspected scirrhus. In parts the elements were those of scirrhus; in parts, of adenoma: while the greater portion examined presented the typical microscopical appearance of cystic sarcoma.

Varieties.—Medullary Cancer.—Dependent upon the relative proportion of connective-tissue elements and epithelial cells contained in its trabecular framework, we describe the cancer as hard or soft. In the medullary cancer there is a preponderance of the epithelial masses of cells, which form plugs in the uterine tissue, under the mucous membrane, invading the areolar elements. This invasion proceeds, both in an outward direction and inwards towards the cavity of the uterus. The areolar structure is compressed by the great growth of cells, which ultimately soften, degenerate, and break down into cancer-juice. This process of cell-proliferation involves, after a time, the vaginal roof, and then begins that peculiar fixation of the uterus so characteristic of malignant disease. This infiltration may extend beyond the vaginal roof, attack the pelvic viscera, and reach the lymphatics. For a considerable time the ulceration may not attack the body of the uterus, destroying only the cervix; but ultimately the body of the womb is invaded. This cell-growth leads to death of the areolar tissue, softening, and ulceration.

Meantime the vessels supplying the cervical villi have increased in size; the latter have also become enlarged and hypertrophied. A papillomatous condition is the result. These papillæ, situated on a hardened and infiltrated base, are prone to bleed. Commencing as papillary hypertrophy, the malignant type is assumed, sooner or later, by the commingling of the characteristic nests or 'comedons'

CARCINOMA OF FLOOR OF PELVIS.

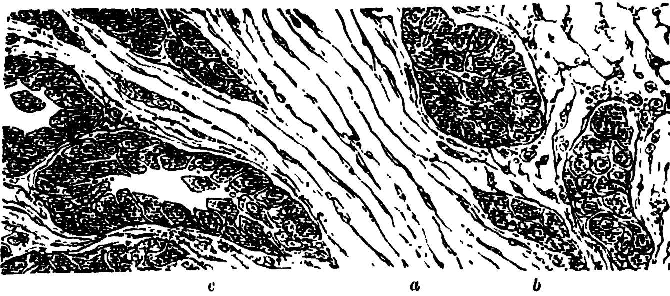


FIG. 443.—SCIRRHUS AND ADENOID PORTION. (× 200.) *a*, Longitudinal bundles of coarse fibrous connective tissue; *b*, small nests of cancer epithelia, the scirrhus portion; *c*, gland-like formations of cancer epithelia, the adenoid portion.

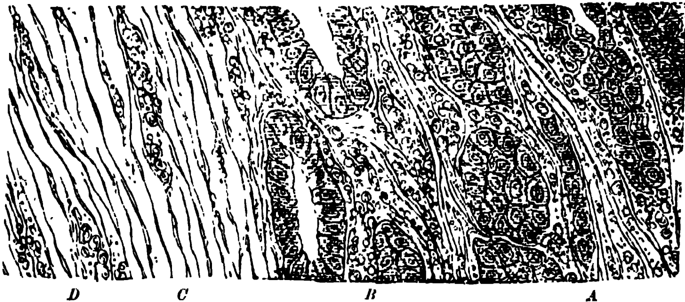


FIG. 444.—ADENOID AND MEDULLARY PORTION. (× 200.) *A*, medullary portion of cancer; *B*, adenoid or gland-like formations of cancer epithelia; *C*, so-called small cellular or inflammatory infiltration of fibrous connective tissue; *D*, longitudinal bundles of coarse fibrous connective tissue with formations of nests between the bundles.

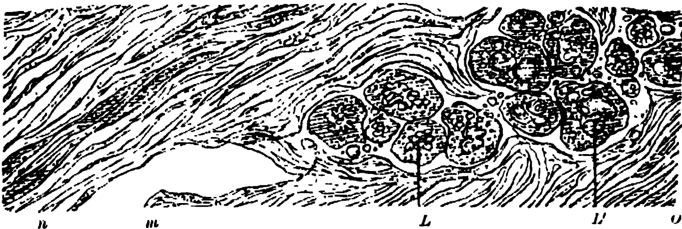


FIG. 445.—THROMBOSIS OF LYMPH VESSEL OF LEFT OVARY WITH CANCER EPITHELIA. (× 600.) *O*, Fibrous connective tissue of medulla of ovary near hilum; *n*, bundles of smooth muscle fibres; *m*, lymph vessel with unchanged endothelial lining; *L*, cancer epithelia filling and extending the calibre of lymph vessel; *L'*, cancer epithelia whose nuclei show karyokinetic figures.

of epithelial cells, which form plugs in the submucous tissue. Rapid cell-proliferation, great increase in the villi, enlargement of the vessels, and accompanying degeneration and liquefaction of the cells, result in a sprouting or vegetating papillary growth, vulgarly known as *cauliflower excrescence.*

Carcimona and Epithelioma of the Cervix.—Some authors (following Lebert) still distinguish carcinoma from epithelioma, or cancroid. The distinction is of some clinical importance.

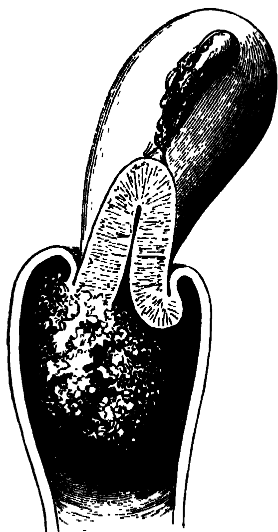


FIG. 446.—CAULIFLOWER EXCRESCENCE GROWING FROM THE CERVIX UTERI. (After Sir J. Simpson.)

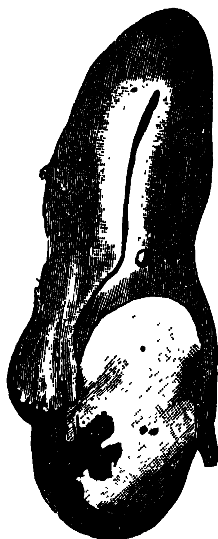


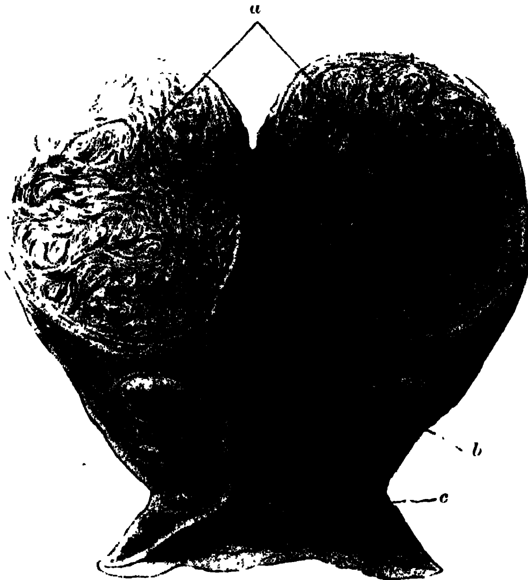
FIG. 447.—CANCEROUS GROWTH IN THE POSTERIOR WALL OF CERVIX, ULCERATING. (J. Williams.)

Galabin has described the histological character of cancroid growths as most variable.

He found, as the exception, the epithelial globes, or bird's-nest bodies. The characteristic cemented or 'cogwheel' appearance of the epithelium has been generally present in the epithelial masses—squamous in character, and bounded by 'a regular margin of columnar-like cells.' In older portions of the growths there was no cell-border to the masses. They were more or less detached from each other, in groups, and the intercellular substance was absent. Both the cells and nuclei varied considerably in the arrangement of the former and the size of the latter. In a small number of cases there was evidence of cell-proliferation of the mucous glands. In a tenth of the entire cases examined the structure was that of sarcoma or lympho-sarcoma.

According to Hart and Barbour, we may group together the researches of

PLATE XV.



ADENOMA OF THE UTERUS. (Landau.)
a, adenoma of body; *b*, fibromatous nodule; *c*, cervix.

PLATE XVI.



CARCINOMA OF CERVIX WITH FIBROMA OF FUNDUS. Tumour size of fœtal skull at term. Removed from a spinster aged 58. Vaginal hysterectomy—good recovery; survived over twelve months. (Author.) [*To face p.* 552.

Klebs, Waldeyer, Virchow, Ruge and Veit, and trace the origin of all these cervical malignant growths, either to (*a*) the cubical epithelium of the cervical glands; (*b*) the deepest layers of squamous epithelium on the vaginal aspect of the cervix; (*c*) the connective tissue cells of cervix; (*d*) the epithelium of the cervical canal.



FIG. 448.—ADENO-CARCINOMA OF THE CERVIX WITH HYDROURETER OF BOTH SIDES. The disease stops abruptly at the junction of the body with the cervix; below, it extends well out into the vaginal vault and the right broad ligament, and involves the entire thickness of the cervix. The right ureter, seen cut across, is conveted into a large hydroureter. On the left side two ureters are seen, which were also converted into hydroureters of lesser degree. (Howard Kelly.)

Curettings in Suspected Malignant Disease.—The three following drawings are sections of growths removed by me from the interior of the uterus by the curette. All were treated in the same manner. The uterus was dilated thoroughly, the curette was freely used, and, when bleeding was arrested, a solution of chromic acid (ʒi.—℥i.) was applied on the cotton-wool holder to the cavity. Periodical applications of carbolized iodine were subsequently made.

Mrs. ——, aged 44, peculiar hæmorrhagic tendency; epistaxis frequently; hæmoptysis on and off; hæmorrhage from bowel; slight pressure of the finger on the skin produced ecchymosis. The application of a linseed poultice left a large livid surface; occasionally profuse menorrhagia. There was a syphilitic history, and she had had some stillborn children. She contracted syphilis ten years previously. A digital examination of the uterus produced violent bleeding, necessitating a tampon. After palliative treatment for a little time without avail, the uterus was fully dilated, and a fungoid mass was discovered

filling the fundal cavity. This was removed with the curette and Sims' knife, and chromic acid was applied. (Such a case with our present knowledge should be dealt with by pan-hysterectomy.) The section (Fig. 449) shows character of the mass removed. Recurrence after a period of quiescence took place, and the same treatment was again adopted. The disease soon involved the entire cervix and the vaginal roof. Death occurred in about eighteen months from the time I first saw her.

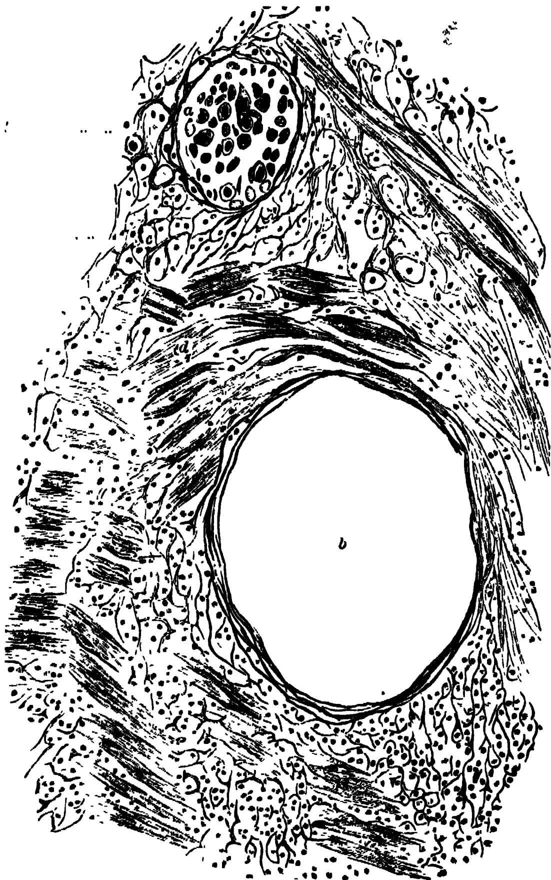


FIG. 449.—*a*, A collection of round and irregular large and small cells. *b*, Large space, probably vascular; *c*, loose, succulent connective tissue, many of the cells branched, and looking like myxoma cells; *d*, spindle cells and fibres, probably developed from *c*. (Author.)

Mrs. ——, fungoid-looking mass protruding from cervix; on dilatation the same growth was found filling the cervix, and there was also a fungoid state of the fundal mucous membrane. I cleared the fundus with the curette, and applied chromic acid solution. Carbolized iodine dressings were subsequently

used. The section (Fig. 450) shows the nature of the growth removed. There has been no return of the disease.

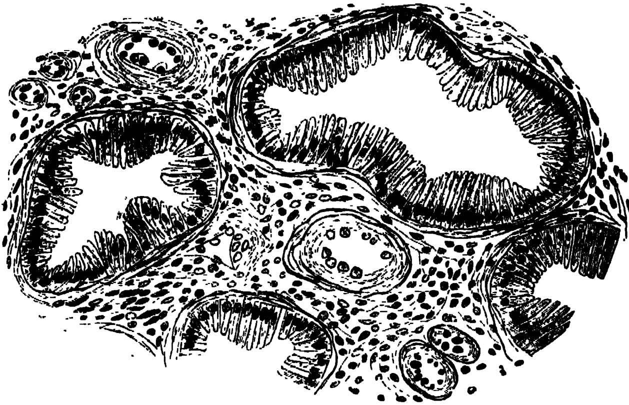


FIG 450.—MICROSCOPICAL SECTION OF GROWTH REMOVED BY CURETTE.

Mrs. –, aged 36, consulted me for slight coloured discharge and ovarian pain; had been treated for uterine enlargement and inflammation. On

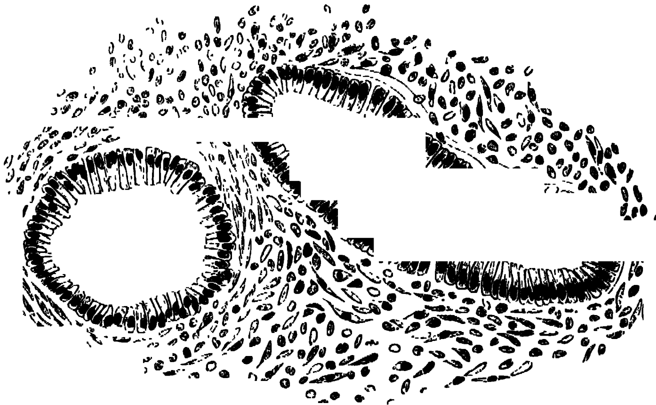


FIG. 451.—SECTIONS SHOWING GLANDULAR ALVEOLI LINED WITH COLUMNAR EPITHELIUM—MATRIX OF EMBRYONIC CONNECTIVE TISSUE AND BLOOD-VESSELS IN SECTION. [In the portion figured there is no evidence of epithelial proliferation or encroachment into the surrounding tissue; other parts of the sections, however, show these conditions—*i.e.* an approach to epithelioma.]*

examination I found the os uteri filled with a mass of a raspberry appearance, bleeding on being touched. I dilated the uterus, and found a growth (Fig. 451)

* Phineas Abraham furnished for me the pathological report on these sections.

above the cervical canal filling the fundus. With the curette and knife I completely removed the entire mass. I applied chromic acid (ʒi.—℥i.) to the cavity subsequently, and dressed with iodized phenol. She is at present in perfect health. The growth was removed some twelve years since.

Morphology.—Roger Williams has made some valuable observations on the morphology of cancer:—

1. In no single instance of the cases investigated had the disease originated from the peritoneal lining of the uterus.

2. Of 4,628 consecutive cases of primary cancer in females, 1,571 were uterine, forty were vaginal, and none originated in the Fallopian tubes.

3. Schroeder's revised estimate of the proportion of cervical cancer to that of the body is one in forty. Blau, Hoffmeir, and Pichot estimated it at one in sixteen, the reverse of what occurs in myomata.

4. Some 90 per cent. of the cases examined are of the cylinder-cell variety of cancer.

5. In both the cylinder-celled and squamosal varieties the initial lesion is generally a small solitary nodule, not a diffuse infiltration.

6. The proneness to bleeding in cancerous ulceration is due to the covering of the exposed cancerous surface with fine capillaries, readily ruptured.

7. In cancers of the cervix constituent cells undergoing mucoid or calciform changes, similar to those so characteristic of the cells of the cervical glands, have been observed (Cornil).

8. Uterine cancer cells are prone to fatty, caseous, mucoid, and other degenerative changes. Colloid and pigmentary metamorphoses are very rare.

9. Though the parasitic protozoa of Müller are present where the cancerous growth is most active, as in the form of rounded, hyaline, spore-like bodies, they are not to be regarded as specific cancer microbes; nor are the blastomycetes occasionally found to be regarded as specific cancer microbes.

10. In the cervix the tendency of the disease is to spread downwards, forwards, and outwards towards the anterior vaginal wall and the base of the bladder, while in the body the direction is towards the peritoneum, progress being much slower than in the cervix. Statistics show that the tendency of cancer of the uterus is almost invariably to disseminate locally, and hence the frequency of rapid recurrence after ablation. *Cervical cancer may also spread upwards and invade the corpus; this need excite no surprise when we recollect the freedom of the anastomoses between the lymphatics of the two segments of the uterus, and the facility with which retrograde lymph-currents are set up.* Also, cancerous foci have been found in the body in cases of primary cancer of the cervix with no structural alteration of the intervening parts.

11. *Renal and other Complications.*—Of seventy-eight patients who died of uterine cancer, Roger Williams found the kidneys diseased in every case, the vagina in seventy-two, and the bladder in fifty-six. The rectum was infiltrated in nineteen, and the pelvic contents were matted together in thirty-four cases. The ovaries were invaded in thirteen, the broad ligaments in five, and the Fallopian tubes were diseased in ten cases.

12. *Glandular Involvement.*—There is a great contrast between the lymph-gland dissemination in the case of the uterus, and of the mammary gland, it

being much less frequent in the former than the latter. The ilio-pelvic group of glands are those most frequently invaded—fifty-six in Williams' cases. Next in frequency come the pelvic glands, and in exceptional instances the lumbar glands. In a small proportion the inguinal glands and mesenteric ganglia were invaded. The occasional involvement of the supra-clavicular glands, due probably to regurgitation of lymph charged with cancer cells from the thoracic duct into the adjacent cervical glands, is usually a late symptom, and in itself a contra-indication to operation. Rarity of dissemination in the adjacent lymph-glands as detected by operation is the rule, and glandular recurrence is rare.

Williams concludes that it may be taken as a general rule 'that the uterus is one of those organs in which the liability of cancer to disseminate in distant parts of the body is not very great.' Williams has met with it in 20 per cent. of patients suffering from cancer of the uterus, as compared with 73 per cent. attacked with cancer of the breast.

Origin—Local or Constitutional.—The most distinguished pathologists have been divided in opinion as to whether cancer be primarily a local disease—one of the peculiar characteristics of which is to rapidly invade the system through the blood and lymphatics—or if it be but the local manifestation of a constitutional or general blood state. The weight of evidence, both clinical and pathological, appears to me to be on the side of those who hold the former opinion. It is a common occurrence to find cancer in persons of a robust constitution in other respects. We must, however, admit that there is much to be said for both these views. It is certain that in many persons there is a constitutional vice present long before the malignant tendency manifests itself, and the hereditary nature of the disease in some few cases would seem to corroborate this opinion. There are peculiarities connected with the malignant tendency in some organs, as in the breast, the penis, the lip, and the scrotum, which appear strongly to favour its local origin. On this interesting question, however, we cannot enter here. Scheurlen's statement that he has discovered a morphologically distinct cancer bacillus has not been substantiated by subsequent observers, Sänger and Virchow proving that this bacillus grew on potato sections without cancerous origin; nor were Ballance and Shattock, in their experiments with cultivations of the microbe, able to propagate the disease by inoculation.

Predisposing Causes.—It would appear from the statistics of Simpson, Kiwisch, and others, that in one-third to two-thirds of all cases of cancer, the uterus is the organ affected.

Of encephaloid, epithelioma, and scirrhus, the last-named is

comparatively rare—I have only seen two well-marked, and one uncertain, case of *true* scirrhus of the womb.

The concensus of opinion is in favour of the predisposing influence of labour and laceration in causing malignant disease of the cervix.

Age.—The tendency to cancer of the uterus increases after thirty years of age, the largest proportion of cases occurring during the menopause, from forty to fifty, and in married women—excessive sexual intercourse acting, it is believed, as an exciting cause. Yet, as Schroeder remarks, 'prostitutes have no special tendency to cancer of the uterus.' Nor does it seem that the popular belief in the hereditary character of the disease has much foundation in fact. These statistics, cited by Schroeder, are of interest:—

Of 1,237 women attacked with cancer, 753 were from 40 to 60 years of age.
Of 1,000 Viennese women attacked, 771 were married or widows.
Of 948 women affected, in 78 only was it hereditary.

Coe states that over one-fifth of the recorded cases of cancer occur in patients under forty years of age.

Eckhardt has noted a case of carcinoma in the cervix of a virgin of 19; Biegct, at 19; Glatter, at 17; Schauta, at 16; Mundé, at 23; and Rosenlein, at 2 years.

These are some of the earliest occurring instances of carcinoma on record.

In the Frauen Klinik at Munich, of 678 cases of cancer of the uterus, the mean age of the patients was 45·05 years, the youngest twenty-four, and the oldest seventy-three. Of the 2265 cases classified by Gusserow, only two were under twenty years of age. The following table gives the percentages of the 2943 cases:—*

Age	20-30	30-40	40-50	50-60	60-70	Over 70
Gusserow	3·5°/o	21·0°/o	34·4°/o	25·5°/o	11·3°/o	3·7°/o
Munich	3·7°/o	27·5°/o	39·1°/o	24·4°/o	4·8°/o	0·1°/o

The ten most susceptible years were from forty to fifty. Statistics would go to prove that the disease is on the increase, and that the portion of the uterus most frequently affected is the cervix, the growth extending generally in the direction of the vagina or paremetrium, less frequently to the bladder, and rarely to the rectum. Of 678 women affected, only twenty-five were sterile, multipara

* Blumenfeld, *Münh. Med. Wochenschrift*, 1899, 13.

being the most liable to the disease, almost in proportion to the number of conceptions. Heredity appeared to play but little part in its production, but tuberculosis was not uncommon.

I have only personally followed the stages of one case in which pre-existing cervicitis, whether catarrhal or granular, has gradually passed into malignant disease of the uterus. I have frequently met with cases in which I have been told that this has occurred, but the diagnosis of malignancy has been clear on my seeing the patient. The existence of follicular hypertrophy of the neck in multiparæ, and its persistence after the menopause, is the condition I specially fear among the premonitory or predisposing conditions. Such follicular conditions I have seen terminate in carcinoma. The presence of lacerations of the cervix in some cases may be fairly looked on as a mere coincidence of the multiparous uterus; the strongest predisposing cause unquestionably is repeated pregnancies. Race seems to exert considerable influence, judging from the comparative but by no means complete immunity of the negro races. The predisposing influence of heredity and age has been already noticed.

Examination of the Uterus after Pregnancy.

American authorities insist on the importance of making an examination periodically after confinement, so as to note the appearance of any lesions that may have followed labour. Kelly advises that every woman over thirty-five years of age with a laceration should be yearly examined with this object, and Stone advises that all women in whom we have reason to suspect, through heredity or otherwise, the occurrence of cancer should likewise be examined.

Clinical Differentiation.—The clinical distinction of cancroid and carcinoma may be found in the comparatively slow progress of the cancroid or epithelioma, the more superficial situation of the latter disease in the early stage, and its spreading character. Carcinoma is more rapid in its progress, and affects by metastasis the pelvic and lumbar glands and distant organs, as the lungs and liver. The 'rodent,' 'cancroid,' or 'corroding,' ulcer of Clark is a rare form of malignant ulceration. In it there is a rapid molecular death of the tissues, without any induration. Extensive ulceration is the main feature, often continuing for years before death occurs. The 'cauliflower excrescence,' or malignant vegetating papilloma, has been already briefly referred to. While the differentiation, clinically, of the different forms of epithelial cancer becomes almost impossible when the disease has lasted for any time, and ulceration has

extended widely and deeply, the distinctive characters of *scirrhus*, in its slow progress, the hard and nodular nature of the growth,

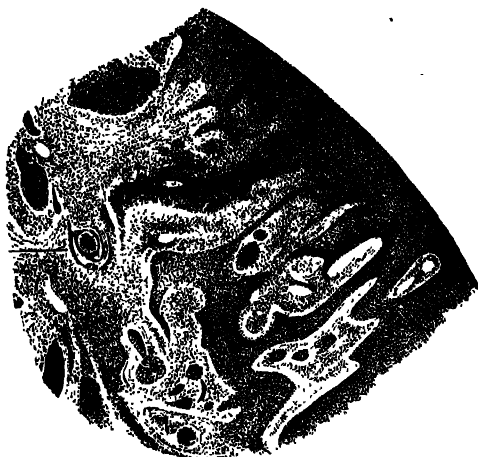


FIG. 452.—SURFACE OF CERVIX, SHOWING EPITHELIAL INGROWING. (Author.) (High amputation—death fifteen months subsequently.*)



FIG. 453.—TRUE 'NEST.' (Same specimen) *a*, FIG. 452.



FIG. 454.—FASCICULATED CONNECTED TISSUE. (Same specimen.)

and the small discharge that attends its earlier stages, are quite apparent.

* 'The growth is a typical example of epithelioma, anastomosing prolongations, "tubular" and irregular, extending from the surface epithelium of the os into the subjacent tissue (Fig. 452). In several of these epithelial encroachments, centripetal collections of young cells—the so-called "nests"—are formed (Fig. 454), or in process of forming. In some of these the central (newest) cells are very large, succulent, and rapidly dividing. In the tissues—fibrous and muscular—which surround the heterogeneous epithelial ingrowths, the usual small-celled inflammatory infiltration characteristic of these malignant growths is evident in several places.' (Abraham.)

Symptoms and Physical Signs.—Cancer of the cervix uteri has, as a rule, four symptoms, so characteristic that it is well to group these in the first place together. They are:—

Pain;
Hæmorrhage;
Fœtid discharge;
General cachexia.

The first important clinical fact connected with the symptomatology of malignant disease of the uterus, which it is right for the practitioner to keep in mind, is that *cancer of the womb, whether of cervix or body, may exist for a considerable time, and many or all of its characteristic symptoms remain in abeyance.* On several occasions myoma of the uteris has called for operation, and the presence of cancer has been discovered for the first time at the operation. I have seen extensive carcinoma of the cervix on several occasions, where the first thing complained of was hæmorrhage. This has led to an examination, and the cancerous state has been recognized. Here is a typical example of this class of case:—

A patient with a large malignant excavation of the cervix sought my advice for severe hæmorrhage, which necessitated plugging and the use of ergot subcutaneously. She had not previously consulted any one for the uterine trouble. There was an old history of syphilis. She declared that she had no pain, and the only thing she had noticed was the flooding. This she attributed to her 'change of life.' The vaginal roof was not involved, but the entire cervix was excavated, and bled profusely on examination. Only lately had she found foul odour from the discharge. There was no marked cachexia, and nothing to attract attention.

Cases of an exactly similar nature to this, in which no pain is complained of, and where the patients first seek advice when it is too late to propose any operative measures, the peri-uterine structures and Douglas' pouch being involved, are not infrequent in occurrence. In the same way some patients suffer from erosion of the cervix and leucorrhœal discharge. They pay little attention to this, treating it as 'whites,' and seek no advice, or they are not examined until the cervical tissues are deeply fissured and the malignant change has commenced.

Pain.—The pain of cancer is generally of a burning or lancinating nature, and is especially felt at night. Early in the disease coitus is painful, and the uterus is sensitive. At other times intercourse gives rise to no pain. As the disease spreads to

the vagina the pain is increased, and is more aggravated. It is felt with the movements of the bladder and rectum, and prevents sleep. The pain is often concentrated in the sacral region, and travels in the course of the sacral nerves, and extends down the backs of the thighs. Later still, it becomes intolerable, and the patient craves for morphia and sedative injections.

Hæmorrhage.—In the earlier stages of the disease, this is the most frequent symptom. At first, it may be simple menorrhagia. The menstrual flow is increased. Perhaps there is some slight bleeding with intercourse. After a time it becomes metrorrhagic in character,

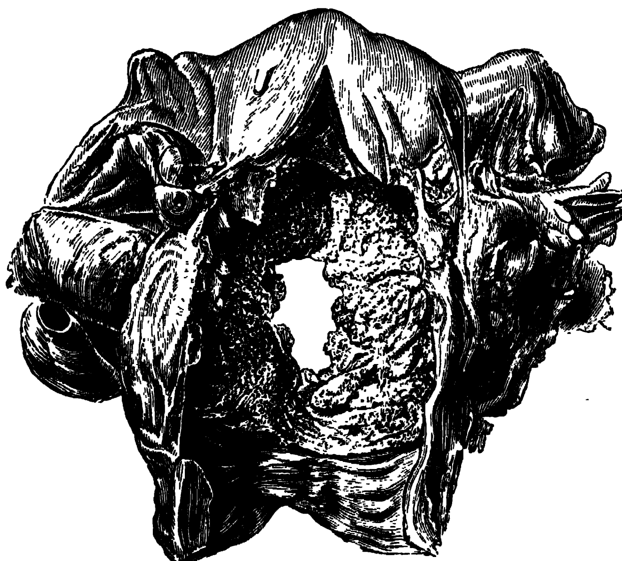


Fig. 455.—Cancer eating away the Lower Half of the Uterus, and perforating into the Bladder. Half-size; St. Thomas's Museum. (Robert Barnes.)

and there is either a constant or periodical discharge. We may be also suspicious of malignancy if, on examination, the cervix bleed readily when there is no erosion to explain this; if the cervix be congested, the veins somewhat engorged, and the lips of the os have a glazed and semi-everted look. The half-watery, partly bloody, somewhat fœtid, and erratic nature of the discharge in the earlier stages of malignant disease is always sufficient in itself to arouse suspicion. Finally, the tendency to menorrhagia may be the symptom most urgently demanding attention.

Fœtid Discharge.—It may be laid down as a safe rule in gynæcological practice—polypus, and conditions arising out of pregnancy being excluded—that if there be hæmorrhage with fœtor, we should always be suspicious of malignant disease. The fœtor arising from the putrescence of the disintegrating and necrosed uterine tissue we may look on as the most invariable accompaniment of cancer of the womb. The patient herself soon becomes aware of the odour. In the final stages of the disease, if not controlled, it pervades her clothes, and the room in which she is confined.

Renal Complications.—Frequently there are most distressing renal and vesical symptoms, which are due to involvement of the ureters and bladder in the disease. The former may be ulcerated or distended through obstruction at their lower ends. McClintock was the first who drew attention to the occasional termination of the disease by uræmic poisoning from nephritic changes. Such renal changes consist, according to Strauss and Germont, in alterations in the papillæ and the pyramids. The former are flattened and irregular, while later on the secretory tissue of the kidney is destroyed, its place being taken by a fibrous membrane. If the bladder be engaged in the disease, the extension of mischief to the ureter and kidney is generally of a rapid character, and is rarely followed by pyonephritis, the renal consequences being due rather to the obstruction of the ureters with resulting hydrops ureteri.

General Cachexia.—Sooner or later the involvement of the system in the affection, brought about by the pain, sleeplessness, anxiety, pelvic visceral trouble, loss of blood, and constant discharge, manifests itself. There is general emaciation, and the face has the anxious, painful, and worn expression common to cancer elsewhere. In protracted cases there is a discoloured, almost icteric tint.

There is in uterine cancer the same tendency to return, after removal, that stamps the disease in other parts. As it progresses, the general clinical features will depend to a great extent upon the degree to which other parts or organs are involved, and the accidental complication that may arise; for example, uræmic symptoms from the involvement of the ureters, and death by coma. The rectum and bladder, the pelvic and general peritoneum, the pelvic veins, and lymphatics, may each in turn be attacked. Septicæmia, peritonitis, phlebitis, or pneumonia may follow.

Physical Signs.—In the early stage of malignant disease there is not much to rely on as distinctive of malignancy. The hardness of the cervix, or the increased sensitiveness and slight hæmorrhage,

are not in themselves sufficient to justify any positive decision. But the local conditions after a time leave little room for doubt. The soft and friable cervix, with the everted and hardened rim of cervical tissue; the proneness to hæmorrhage even on a slight examination with the finger; the detection of fœtor; the fixed uterus; its ragged and excavated appearance, or the presence of a vegetating, fungus-like and bleeding mass, seen with the speculum, are not, with any exercise of care, to be mistaken for laceration, erosion, areolar hyperplasia, or sloughing polypus. If the bladder and rectum be involved, the distress becomes great, and the woman's cup of suffering and misery is filled to overflowing, release from which is only to be had in death.

In all instances where, early in the disease, a doubt exists between a benign and malignant condition, the microscope should be brought to our aid, and a small portion removed and carefully prepared for examination. In malignant disease of the body of the uterus, where the curette is used, not only should we get a portion removed rather deeply and extending into the parenchyma, but of equal importance is it to get particles from two or three different situations. The typical appearances of the stroma, alveolar spaces, and nucleated cell, will enable us fairly to decide as to the malignancy or otherwise of a growth. Yet this test must ever be looked on as only one of the several proofs of malignancy, as it is often difficult to obtain sufficient tissue to enable us to exclude the possibility of malignant infiltration.

Differential Diagnosis.

Laceration, with erosion and granular degeneration of the cervix.
Papillomatous growths (benign).

Hyperplasia of cervix.	Sarcoma.
Syphilitic ulceration.	Follicular hypertrophy.
Polypus of the cervix.	Intra-uterine sloughing fibroid.

Any of these conditions may be mistaken for cervical cancer.
Our diagnosis must depend on these clinical facts :—

1. The comparatively rapid history of the case.
2. The absence of other proofs of syphilis.
3. The age of the patient, and the evidence of heredity.
4. The presence of the characteristic symptoms and signs of malignancy: especially—pain, hæmorrhage, ichorous leucorrhœa, fœtor, rectal distress, and pain on defæcation.

5. Immobility of the mucous membrane on the subjacent tissue —early in the disease (Waldeyer)—and fixation of the uterus. Later on, the resistance of the cervical canal to the action of a sponge-tent (Spiegelberg).
6. The involvement of the adjacent vaginal wall.
7. The tendency to resist treatment, and to return after removal.
8. The cachectic appearance of the patient.
9. The physical condition, as felt with the finger and seen through the speculum.
10. Evidence of metastasis, and of malignant growths elsewhere.
11. The microscopic appearances.

Early Physical Appearances.—Stratz has drawn special attention to the colour of the excoriated surface early in the disease :—

(*a*) A yellowish-red granular surface;
(*b*) A slight yellowish discoloration;
(*c*) Yellowish-white, glistening, granular bodies over the surface of the cervix.

I have frequently noticed this discoloration in cases of threatening cancer, as also the dark-red swollen proliferation of one lip, pretty sharply defined and somewhat elevated, described by Stratz. The vaginal mucous membrane appears also to partake of this process of discoloration and infiltration; it assumes a yellowish or mottled look, and has rather a smooth leather-like surface and feel.

Carcinoma of the Body of the Uterus.

There are important reasons for studying cancer of the body of the uterus apart from that of the cervix. We may epitomize these as follows :—

1. It is not so common as cancer of the cervix.
2. It is a disease of more advanced life, occurring generally during or after the menopause.
3. It is found more frequently in nulliparous women.
4. Histologically it is more allied to sarcoma or adenoma.
5. The symptoms are more obscure than in malignant disease of the cervix.
6. The body of the uterus is the part affected, the cervix being comparatively free: the body may be enlarged, or hollowed out, and filled with the cancerous mass: or the parenchyma may be the part principally involved.



FIG. 456.—CANCER OF THE BODY ASSUMING THE APPEARANCE OF A SUBMUCOUS FIBROID. (Rüge and Veit.)

In the Body.—The disease may commence either in the epithelium of the uterine glands or in the parenchyma. As I have shown, it is believed also to begin in the connective tissue.* A general thickening of the mucous membrane with disintegration and discharge follows, or scattered nodular deposits or a diffused infiltration are formed. Perforation of the uterus ultimately may occur, an opening into either the bowel or bladder being the result. This accident may be prevented by adhesions.



FIG. 456A.—CARCINOMA OF THE CERVIX.†

Diagnosis.—When any patient, over forty years of age, presents herself, complaining of pain, intermittent hæmorrhage, fœtid discharge of a watery nature, at times coloured, especially if these symptoms make their appearance after the menopause, and where menstruation has ceased for some time, cancer of the body of the womb may be suspected. If on digital examination the cervix be found healthy and the fundus enlarged,

* See p. 551.

† Drawing from specimen in Cancer Hospital museum. Case of Mr. Jessett.

and with the uterine probe some foul-smelling and discoloured discharge can be wiped from the cervix, that suspicion should be increased. The safe rule is to dilate the cervix and examine the cavity of the uterus with the finger, removing with the spoon curette two or three portions of the endometrium and subjacent tissue for microscopical examination. Such microscopical examination and careful attention to the history of the case will enable the surgeon to decide as between cancer, a *sloughing intra-uterine fibroid,*



FIG. 457.—CARCINOMA OF THE BODY OF THE UTERIS.*

polypus, or fungous endometritus. The chance of a mistake being made in regard to the *products of conception,* if suspicious symptoms should arise in the child-bearing period of life, should not be lost sight of. If the cavity of the uterus be carefully explored and found enlarged, or any soft mass protruding into it, which bleeds readily and imparts foul odour to the finger, we may feel fairly certain of the disease being malignant. If, in addition, the uterus be fixed by adhesion, and there be accompanying cachexia,

* Drawing from specimen in Cancer Hospital museum. Case of Mr. Jessett.

there need be no doubt. The microscope will dissipate any that remains.

Fungus endometritis must be carefully distinguished pathologically from cancer of the body of the uterus.

Differentiation of Fungous Endometritis.—Heitzman (New York), commenting on the fact that it is extremely difficult to diagnose accurately some of the conditions resembling fungous endometritis from repeated microscopical examinations, concludes that—

'*Endometritis Fungosa* is characterized under the microscope by the presence of a varying number of tubular utricular glands, the epithelia of which are columnar, ciliated, but always unbroken. The connective tissue between the tubular glands may be crowded with lymph-corpuscles, exhibiting a hyperplasia of the adenoid or lymph-tissue of the uterine mucosa, or the interstitial tissue between the tubules is found to be myxomatous, or even fibrous, in nature. These differences probably depend on the age of the patient.

'*Polypoid Tumours* consist of myxomatous tissue, and are properly termed myxomata; or if bundles of a delicate fibrous connective tissue enter the structure, fibro-myxomata. Glandular formations in such tumours are, as a rule, scant or absent; they not infrequently contain cysts.

'*Sarcoma*—especially in its earlier stages—occurs under the clinical symptoms of fungous endometritis, mostly diffused; and the correct diagnosis can be made with the microscope only when the epithelia of the tubular glands, either the original or newly-formed, are destroyed by the sarcomatous growth.

'In sarcoma the epithelia of the utricular glands are transformed into sarcoma corpuscles, either directly by a process of division, or through the intervening stage of a coalescence into granular protoplasmic masses.

'*Papilloma of the Uterine Mucosa* does occur in exactly the same way as on the mucosa of the urinary bladder. This form of tumour is extremely rare.

'*Adenoma* is a rare form of tumour, sometimes appearing under the clinical features of fungous endometritis. It consists of a new growth of the utricular glands in a plexiform arrangement with narrow calibres. The connective tissue between the epithelial formations is fibrous and scanty.

'Cancer appears in the uterine mucosa in the form of epithelioma and medullary cancer. The utricular glands are not directly formed into cancer nests, but the epithelia of the utricular glands first break up into medullary corpuscles, or into larger masses of protoplasm, from which the cancer epithelia arise.'

Sarcoma.

Compared with carcinoma of the cervix, sarcoma is a comparatively rare disease, probably not one case in twenty of malignant disease proving to be of the sarcomatous nature. In the body of the uterus, however, it is relatively much more common, about half of the cases of malignant disease of the corpus being sarcoma. It is



FIG. 458.—ADENOMA UNIVERSALE. Uterus of patient, aged 34; virgin. (Oliver.)

In 1895 there were two mucous polypi removed from an enlarged uterus; in 1897, suffering from menorrhagia, a mucous polypus was removed, and the uterus was dilated, explored, and curetted. Watery discharges followed, with increase in the size of the tumour. She was re-curetted, and subsequently the uterus was removed by abdominal pan-hysterectomy. Weight of uterus, twenty-eight ounces; size, that of a three months' pregnancy. The figure shows the uterus opened by a triangular flap, made from the cervix to the fundus, and the enormous number of smooth prominences, some sessile, a few pedunculated. The new growth had quite infiltrated the muscular tissue. The microscopical appearances were typical of carcinoma. Oliver gives to the pathological condition the name of 'adenoma universale,' rather than that of malignant adenoma. The history of the case would point to the disease having lasted for some years. I am indebted to Dr. Oliver for this plate.*

* *Brit. Gyn. Jour.*, May, 1899.

recognized, pathologically and clinically, as occurring in two principal forms, according to the structure in which it arises. This may be either the parenchyma of the uterus or its mucous membrane—from the latter rarely. In the former case it is of a more isolated character, and the nature of the growth will depend upon its subperitoneal, interstitial, or submucous situation. The submucous and subperitoneal project on the surface or into the cavity of the uterus in the direction of least resistance, while the interstitial are disseminated in the tissue of the wall of the body of the uterus. Such submucous sarcomata occasionally have had an origin in a polypus. Those sarcomatous growths which spring from the connective tissue of the endometrium usually take the appearance of papillary growths upon its surface, frequently, however, infiltrating the mucous membrane and involving the uterine parietes as far as its peritoneal coat. Thus, certain soft sarcomata may become attached to the adjacent viscera, or project as soft fungus-like masses into the uterine cavity. That a fibromyomatous tumour may degenerate into a sarcoma is now an acknowledged fact. In a multiparous woman at the period of the menopause such a change is more likely to occur. From what has been already stated of the commencement of the generation of cancer epithelia in connective tissue, we are prepared for the actual development of sarcoma from the same elements.

Roger Williams * classifies the various uterine sarcomata under five heads—(1) Infantile ; (2) grape-like, or botryoidal ; (3) sarcoma of the mucosa ; (4) sarcoma of the parenchyma ; (5) deciduoma malignum. Showing the comparative rarity of sarcoma, he mentions the fact that, of 6754 cases of uterine neoplasms, only ten were instances of sarcoma. This, as I have said, must, however, be regarded as far too low an estimate.

Some interesting cases of children affected by sarcoma have been recorded, one at seven months old, and at nine months utero-vaginal extirpation by the sacral way was carried out, the child making a good recovery (Hollander). In C. T. Smith's case, the child was three years and nine months old. It was found to be a round cell sarcoma. Other cases are recorded at four months (Ahfeld), thirteen months (Farnsworth), and two years (Pick).

* In the *British Gynæcological Journal* for May, 1897, there is a complete and most interesting paper, by Roger Williams, on the sarcomata. The bibliography of the subject is fully given, and the various references to all the most important pathological questions are recorded.

Williams considers that many of the malignant tumours of infancy and early life are wrongly named cancerous from the epithelial elements they contain. They are in reality sarcomata. The grape-like pedunculated masses which resemble hydatid moles, and are soft and easily detachable, he regards as highly malignant, being of heterotopic constitution, striped muscle, cartilage, bone and epithelial elements, 'sequestrated from the matrix of adjacent tissues during early embryonic life.' Williams instances several cases of this nature.

Such growths are in some instances papillary, or of a compound sarcomatous character ('adeno-mixo-sarcoma,' 'myo-sarcoma-strio-cellulaire,' 'mixoma enchondromatodes arborescens,' 'fibroma papillare cartilaginescens.') The commonest forms of uterine sarcoma Williams considers to be that of the mucosa, and it is important to note that in the sarcomata of children, as in those of the mucosa, there is in many cases a production of numerous softish round polypoid bosses, and in young patients sarcomata may present themselves as polypoid tumours springing from the inferior segment of the uterus. Further, the infiltration may, as in the case reported by Simpson, spread along the Fallopian tubes to their fimbriated extremities. Mucosal sarcomata assume a large size in the fundus uteri, otherwise they are apt to become polypoid. They are rich in blood vessels, and consist mainly of small round spindle cells, held together by a scanty fibrous matrix. Recurrence and dissemination are apt to occur. Glandular elements, as reported by Kay and Schmitt, are sometimes intermixed with the sarcomatous new formation; and other authorities, as Johnston and Hackeling, have recorded the same intermixture. Parenchymatous sarcoma is, as a rule, more circumscribed than the other varieties, and may put on the telangiectasic type (Aslanain); and Webster has recorded a case of angio-sarcoma, a unilocular blood cyst of the uterine wall, in a patient aged fifty-three. I have already alluded to the transition of fibromyomata into sarcomata (Virchow, Rokitansky, Schroeder).

The sarcomata may, however, also arise from the parenchymatous elements, particularly its peri-vascular and lymphatic. Williams says, 'In the structure of these sarcomata round and spindle cell forms predominate, but myeloid elements have often been noticed. Fibrous tissue, organic muscle cells, blood vessels, and lymphatics are also among their usual constituents. Myomatous and œdematous modifications are fairly common. In the soft, shiny, grape-like, easily detachable masses of the neoplasm we may recognize the

racemose sarcomata, but the microscope alone must be the court of appeal in most cases.'

Symptomatology. — If we contrast the symptoms of the fibro-sarcomata with those attendant upon the diffuse variety, we find that hæmorrhage is present in both, perhaps more profuse in the latter. Semi-sanious watery discharges periodically occur in the two, but when the disease attacks the mucous membrane, particles of necrotic tissue are washed away by the discharge, and are found in it. Severe pain accompanies both the parenchymatous and sub-mucous forms. That of the interstitial growth, however, is more periodical, of an expulsive, 'bearing-down' character, and associated with hæmorrhage. Such pains and erratic discharges are consequently apt to be, and, as a matter of fact, often are, interpreted as menorrhagic or metrorrhagic losses associated with the menopause. There is this striking difference between the two types of disease: In the interstitial form the uterus is greatly enlarged, and frequently its canal is so dilated that we may explore and reach the intra-uterine growths with the finger. In the diffuse variety, on the other hand, though the uterus is increased in size, and possibly immovable, there is no defined tumour felt in it from without. Other symptoms in each case will depend upon the rapidity of the extension of the disease, and the degree of involvement of neighbouring parts in the pelvis, though more remote organs, such as the lungs and liver, may be affected by metastasis. The ultimate fatal issue does not differ from the corresponding termination of a case of diffuse carcinoma of the uterus, when extension has taken place to the structures surrounding it. Indeed, the course and progress of the two diseases is so alike that it is often impossible to distinguish them. Microscopic examination of portions of growth removed by the curette or finger-nail is the only means of arriving at a correct conclusion. There is in sarcoma, especially in its later stages, the same cachectic condition that we have in carcinoma. On examination of a uterus, the hæmorrhage from which renders us anxious, and from which the possible presence of products of conception is excluded, should we see an irregular, soft, reddish-coloured mass protruding from the os uteri or filling its calibre, and readily bleeding, we may be suspicious of sarcoma.

Differentiation.—The more frequent site being the cavity of the body of the uterus, it may be impossible, save by the microscope, to differentiate the two diseases. Clinically there are these distinctions—

The slower course.

The connection with sterility—twenty-five out of sixty-three cases (Gusserow).

The discharge is not so offensive and is more watery, containing greyish-white shreds of sarcomatous tissue.

Pain is not so invariable a symptom. Thomas accounts for the absence of pain in some cases, to which special attention has been drawn by A. R. Simpson, by the portion of the uterus in which the sarcoma occurs. *If the sarcomatous growth be parenchymatous the pain is severe; not so, if it be diffused in the endometrium.*

Sarcoma agrees with carcinoma clinically in—

The tendency to recurrence;

The hæmorrhage which attends it;

The foul discharge after ulceration of the surface;

The pain;

The soft and friable nature of the growth in many instances;

Its fatal termination (in septicæmia, hæmorrhage, peritonitis).

For diagnostic purposes, sarcoma can only be clearly distinguished from carcinoma, fibroid growth, or chronic hyperplasia, by means of the microscope and the detection of the characteristic spindle or round cell.

Prognosis.—This, in every form of malignant disease, is most unfavourable. The average duration of life in cases of cancer of the cervix is from twelve or eighteen months to three years. Such a termination as *spontaneous recovery* has been recorded. But this is so rare that its possibility is hardly to be taken into consideration. On the other hand, if the disease be detected very early, and a partial cure be attempted by removal of the diseased tissue and the free use of the cautery, we may prolong life, if we do not succeed in curing the disease. Death ultimately takes place from exhaustion, septicæmia, or peritonitis, and occasionally from hæmorrhage. The only step to be relied on for giving the woman a chance of life for any considerable time is hysterectomy.

Treatment of Cancer of the Uterus.—We may divide the treatment under the heads of 'Palliative' and 'Radical.'

Palliative and General Treatment.

The use of Paquelin's cautery.
Chloride of zinc.
Chromic acid.
Potassa fusa.
Nitric acid.
Carbolic acid.
Chlorate of potash.
Chian turpentine, internally (Clay).
Methyl violet (abandoned).*

Sedatives internally:
Opium.
Morphia, subcutaneously.
Nepenthe.
Chloral hydrate; chloralamid.
Bromides.
Cannabin.
Hyoscyamus.

Sedatives locally:
Belladonna and morphia suppositories.
Cocaine.
Anodyne washes.

Antiseptic and disinfectant vaginal washes:
Condy's disinfectant.
Formalin solution, 72 per cent.
Peroxide of hydrogen solution, 1 per cent.
Chloral hydrate.
Carbolic acid.
Boric acid.
Thymol.
Chloride of zinc.
Sulpho-carbolate of zinc.
Tincture of iodine.
Chinosol.

Astringents:
Perchloride of iron.
Sulphate of iron.
Tannic acid.
Alum.
Acetate of lead.

Attention to the Rectum.—The state of the rectum is of great importance. The occasional use of enemata or saline waters, and aperient confections and soft food, will do much to prevent the accumulation of scyballa and consequent pressure on the diseased part.

Caustics.—Of various caustics, other than zinc chloride, fuming nitric acid is one of the best. Its mode of application has been previously noticed, as has also that of potassa fusa. Chromic acid (ʒi—℥i.) for relieving pain, arresting hæmorrhage, and checking the ulcerative process, I have always found of great service. The use of any of these escharotics must be combined with that of antiseptic and disinfectant applications, in order to keep the vagina free of the tissue débris, and prevent the horrible odour which is frequently

* Jessett arrived at the conclusion, as regards methyl violet in cancer of the uterus, that 'no good appeared to result from the treatment.'

present. For this latter symptom Sirédy recommends the vagina to be washed out with a solution of perchloride of mercury (1 in 3000), after which a plug of absorbent cotton-wool soaked in a chloral solution (4 per cent.), and dusted with iodoform, is applied to the cervix. This is renewed after two days, and reapplied as often as it is deemed necessary. Condy's fluid, thymol, chinosol (1 in 600), formalin (½ to 2 per cent.), are admirable deodorants and disinfectants.

Jessett recommends as a vaginal tampon equal parts of extract of pinus canadensis and glycerine; also an ointment of ol. sanitas ℥i., zinci chloridi gr. x., vaseline ℥i.

Sedatives.—Pain may be relieved both by local suppositories and pessaries, and the internal administration of *sedatives*. Cocaine, in my hands, both locally applied and used subcutaneously, has failed to give relief. Morphia, injected subcutaneously, is the best means I know of for subduing the pain of uterine cancer. Its use should be postponed for as long a period as possible. It is in the last stage of the affection that it is so necessary. If it be administered earlier it may lose its effect, and fail to give the looked-for relief when its narcotic effect is most needed. It is a good plan to alternate the administration with some other sedative, or a different preparation of opium, given either by mouth or rectum. Chloral and the bromides, or cannabis indica, lupuline, hyoscyamus, monobromate of camphor, or conium, are also useful. It is better to give the full dose at a stated hour in the day, generally approaching night, when the parts have been dressed and the patient has had any local treatment applied.

Internal Remedies.—The more carefully we consider all the vaunted cures of cancer, which from time to time have been practised either by fanatics or knaves, the more we must see that the only rational treatment for cancer is comprised in the one word —operation.

Chian Turpentine.—Clay, of Birmingham, placed before the profession some apparently startling cures by means of the Chian turpentine. Having anxiously tried this medicine with several cases, both in the form of pills and in emulsion, I may record my experience of its effects. In several instances it certainly appeared to arrest the disease, to lessen the pain, and to check hæmorrhage. In none was the effect permanent. In other cases it decidedly restrained the hæmorrhage, but did not arrest the progress of the disease. In some it had apparently no effect whatever.

The combination of arsenic and quinine in the cachexia of malignant disease of the womb is useful.

Hæmorrhage may be controlled by styptic tampons. These must not be left longer in the vagina than twelve hours. The use of warm-water injection, 112° to 120°, should be tried, with the liquid extract of hydrastis and tincture of matico added. Internally, astringents may be given in combination with ergot, also Chian turpentine, hydrastinine, or stypticine. The *strength* of the patient must be maintained by a nourishing but not over-generous diet. Wine is generally necessary; the kind and quantity will depend on the circumstances of the case. Change of air, a well-ventilated sleeping apartment, cheerful companionship—in short, everything that can contribute to make the life of the patient as fairly comfortable as the terrible nature of the malady will admit—should be advised.

Animal Extracts in Treatment of Carcinoma.—Bell, of Glasgow, has reported cases of carcinoma in which amelioration of the symptoms has followed the administration of thyroid extract. Its administration, however, was combined with active local treatment, the application of iodized phenol, ichthyol tampons, and, in some cases, by curettage and caustics.

In cancer of the body of the uterus there is nothing to add to what has been said of the *palliative* treatment of malignant disease of the cervix.

Costive Bowel.—The clinical fact that obstinate costiveness and distension of the rectum occurs in cases of *scirrhus*, should not be forgotten. In a case of cancer of the body of the uterus under my care, in a lady aged fifty-five years, the fatal termination was precipitated by the accumulation of hard fæces in the rectum. Every means failed to remove these, and I had to dilate the rectum and remove some masses with the hand. One of these was of stony hardness; with difficulty I could cut it through with a knife.

Operative Treatment.

Minor Operations.

Amputation of the diseased cervix is performed either with the galvanic écraseur, the wire écraseur, Paquelin's knife, scissors, or scalpel. The latter is certainly preferable. In all these operations the dangers to avoid are: (*a*) Hæmorrhage, (*b*) Injury to the bladder or rectum. The most important points to attend to are: Complete removal of the diseased tissue by cutting through to the healthy structure outside it, and the destruction of any infiltrated tissue after removal of the disease by the free use of caustic or cautery.

Schroeder performed two minor operations, one an *infra-vaginal*,

the other a *supra-vaginal amputation*, of the entire cervix. In both these operations the knife is used, and the wounds are closed by sutures. In the infra-vaginal operation, having first created anterior and posterior lips, a wedge-shaped portion is removed from both. In the supra-vaginal, the incisions are made through the vaginal mucous membrane in either fornix. The bladder and Douglas' pouch are carefully avoided. The cervix is cleared of its cellular tissue, and the amputation is completed by the final stitching of the anterior and posterior vaginal walls, which are united to those of the uterus. Ligature of the uterine arteries considerably facilitates the steps of the operation.

The Galvanic Écraseur.—The patient is anæsthetized, and, when the uterus is thoroughly exposed, the cautery loop is slipped on cold and pushed as far as possible on to the healthy tissue; the current is made, and the wire is tightened slowly; slight traction is made while it cuts through, so as to secure a funnel-shaped stump (Byrne of Brooklyn). With the Paquelin knife there is very little bleeding. The mucous membrane is divided circularly with an ordinary knife, and detached for a short distance. The section is then completed with the curved Paquelin knife.

In using the chain or wire écraseur, the uterus has to be drawn well down and fixed by a vulsellum. The uterine arteries may be first secured, the uterus bisected, and either half removed. The screw must be worked slowly. It is better to treat the stump with Paquelin's or the electric (porcelain) cautery (p. 156).

Thermo-Cautery.—Vulliet's treatment consists principally of the application of the thermo-cautery to the ulcerated cervix after free scraping of the ulcerations. If the interior of the uterus be affected, the cervix is fully dilated, a saturated solution of chloride of zinc is applied, and, after cauterization, the cavity is packed with iodoform gauze or cotton-wool.

The curette must be applied freely, according to the extent of the disease. If the cancerous infiltration should have encroached on the wall of the bladder in front, or the peritoneum posteriorly, care must be taken to avoid opening into the peritoneum, bladder, or rectum. After the use of the curette, Paquelin's cautery, the tampon of chloride of zinc, or the alcoholic solution of bromine (Routh and Schroeder, 1 part to 5), chromic acid, peroxide of hydrogen, may be applied. If bromine be selected, some cotton-wool saturated with the solution is pressed against the surface of the wound, and the vagina is subsequently well plugged with a tampon either soaked

in a solution of, or covered with, carbonate of soda. The bromine tampon may be left in for twenty-four hours. The application may be renewed in about ten days if necessary.

'I have seen,' says Spencer Wells, 'several cases treated by the late Wynn Williams with bromine, but not one ended satisfactorily, although temporary good was done.'

Treatment by Chloride of Zinc.

The steps of the method advocated by Marion Sims are as follows: (1) The removal of the bed of the diseased mass in the supra-vaginal cervix with the knife, scissors, or spoon. (2) The cavity is dried, cleaned, and prepared for the styptic application. (3) The dried cavity is plugged with cotton-wool, which is squeezed, nearly dry, out of sub-sulphate of iron solution, or weak solution of carbolic acid saturated with powdered alum. The upper part of the vagina is packed with the same, and the lower portion with simple carbolic solution. In five days the plug is removed. A solution of five drachms of chloride of zinc to the ounce is now prepared. Some pledgets of cotton-wool are squeezed dry out of this, and packed into the uterine cavity. Pledgets of cotton-wool soaked in a carbonate of soda solution are also used to plug the upper part of the vagina. The cotton-wool with the chloride of zinc is removed in five days.

I have on some occasions used chloride of zinc, with excellent results, leaving only a shell of the uterus.

Jessett showed, at the Gynæcological Society, the cast of an entire uterus removed by packing with chloride of zinc paste. He places a gutta-percha covering over the whole, and neutralizes the caustic with carbonate of soda.

Necrosis of the Uterus.—Browne and Mundé have recorded cases in which, after the uterus was curetted and tamponned by the former surgeon with zinc chloride, and by the latter with perchloride of iron, the entire uterus came away on the tenth day in both instances.

Choice of Operation.—On the much-debated question as to the operation to be advised in carcinoma of the uterus, the views of the most prominent gynæcologists have materially changed within recent years. Hysterectomy by the vaginal route has come to be regarded as *the* treatment for cancer of the cervix and portio, once the presence of malignant disease has been established. In the same manner, in cancer or any form of malignant disease of the body, when it has not extended beyond the uterus and the parametrium is free, vaginal hysterectomy is indicated. On comparing the results of partial operative procedures with the more radical measure, it is apparent that there is little to gain by advising the

former course when we offer so much greater security for the sufferer by the complete removal of the diseased organ. If very early the disease be detected, and, while it is yet limited to the cervix, a Schroeder's high amputation be performed, the results are sufficiently good to warrant the choice of this measure instead of that of hysterectomy. It is in these cases that supra-vaginal amputation has given such good results, and, as compared with hysterectomy, the gain in life appears to be not much less. On the other hand, it cannot be denied that early and complete ablation of the diseased organ, before the lymphatics or the pelvic glands have become seriously involved, offers the patient the greatest certainty of the removal of the entire disease. Recurrence varies, in the majority of such favourable cases, from a period of two to five years. Some 50 per cent. of all cases recurring within a period of time varying from eighteen months to three years. Five years must be taken as the lowest limit to speak of 'non-recurrence' of the disease. After total hysterectomy, a larger number survive this period, and live for a longer time without recurrence, while others escape altogether from the reinvasion of the cancer. From the statistics of such advocates of supra-vaginal amputation as Leopold, Schroeder, Verneuil, and Winter, the prolongation of life is decidedly less than 'in total hysterectomy, while the numbers in whom recurrence had taken place were much greater than in the radical operation.' As Sinclair well says, 'though called major, it is, perhaps, less dangerous than many of the so-called minor operations.'

Gradually, therefore, the minor operative procedures have given place to the two methods of hysterectomy: firstly, that by the vaginal route; and secondly, that by the abdominal. The question whether an operation is warrantable or not, depends altogether upon the degree of extension of the disease. Given a movable uterus and one capable of being drawn down to the vulva, and where the broad ligaments and the pelvic glands are not implicated, there can be no question that operation is justifiable, and here the operation of selection is that by the vagina. Even in cases in which the portio vaginalis is involved and there is vaginal infiltration, the feasibility of removing even the entire vagina proves that in such cases the involvement of the vaginal fornix need not deter us from operation. On the other hand, if the disease has extended beyond the uterus, and the broad ligaments or the glands are implicated, or if the disease be complicated with a myoma, the facility for reaching these extra-uterine structures offered by the abdominal

route makes it, either alone or combined with the vaginal, the most favourable operation for such cases.

In a long and important review of the entire subject of colpo-hysterectomy for malignant disease, by Mary Dixon Jones,* this distinguished American gynæcologist recapitulates all the arguments, statistical and other, which have been advanced on the side of high amputation. She ranges herself rather on the side of the localists in the etiology of cancer, and as a believer in operation to effect a cure in a fair proportion of cases. In this view I am quite with her. She takes the statistics of Léopold, Schroeder, Fritsch, and Martin, advocates of vaginal hysterectomy, as also those of Olshausen, Williams, Lane of San Francisco, Bilroth, and Esmarch, to show that, both on the grounds of prolongation of life and radical cure, this operation is justifiable. Boldt, Cushing, Kurz, Montgomery, Richelot, argue in favour of hysterectomy, on the ground that it is impossible to define the limits of the disease from any examination of the cervix. Every sound surgical principle which we are guided by in treating cancer elsewhere in the body is on the side of total hysterectomy.

Caustics and cautery do not find much favour with the American gynæcologist, nor is she influenced by the results of the treatment by Byrne with the galvano-cautery, and the free charring 'up to and beyond the supposed danger line' by 'a free and fearless cauterization.' Emmet strongly objects to the galvanic wire or écraseur, as also does Jessett.

The researches of Abel are of importance. He shows that the corporeal endometrium is much more frequently affected in cervical carcinoma than was believed hitherto, the change being of the nature of round or spindle-celled sarcoma. This fact would operate in favour of complete and early extirpation.

If the all-round mortality of both vaginal hysterectomy and supravaginal amputation of the cervix be 10 per cent., then it would appear preferable to recommend the more radical step, at least in those cases in which there is a prospect of recurrence of the disease.

Vaginal Hysterectomy for Cancer.—We have already, in the case of myomata, described the various methods of performing vaginal hysterectomy in the case of tumours of the uterus. The operation necessarily varies somewhat in the instance of cancer of the neck or body of the uterus. We have to consider the probability of recurrence of the disease, the extent of the cancerous infiltration, the involvement of glands, and, consequently, the wide removal of the disease. Therefore, in all cases, to save infection, the uterus is thoroughly curetted, and a section of the neck having been made, the lips are stitched together, and for purposes of traction are held by strong suture threads. Some surgeons, however, prefer the use

* *American Journal of Obstetrics*, vol. xxvii., No. 5, 1893.

of the tenacula. Others, again, amputate the diseased cervix with the Paquelin's knife before proceeding to remove the uterus. Also, in operation for cancer, the friability of the invaded tissues has to be remembered, and it is especially necessary, by most careful examination and exploration beforehand, to estimate the degree of involvement of the rectum, bladder, and parametrium. Kelly adopts Pawlik's recommendation to pass a ureteral bougie in those cases in which we fear inclusion of the ureters as a guide to their avoidance during the operation. Under any circumstances the detachment of the bladder and the avoidance of the ureters is the

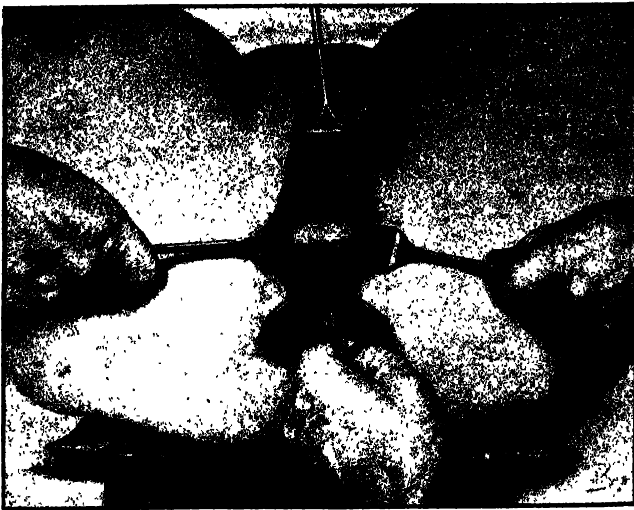


FIG. 459.—CERVIX HELD BY SHORT SILK SUTURES WHICH HAVE BEEN PASSED FOR TRACTION AFTER CURETTAGE OF THE ENTIRE UTERINE CAVITY. (Howard Kelly.)

most important and delicate part in the operation for cancer. Gentleness in working with the finger towards the uterus, and the use of a small sponge in separating the bladder, will prevent the first accident; keeping the scissors close to the uterine neck, the second.

Where necessary, an incision of the vaginal mucous membrane with the scissors a few centimetres outside the limits of the growth is made at either side, and these marginal incisions are connected with that over the anterior surface of the uterine neck. The mucous membrane is then detached by the left index-finger from side to

side, and this is followed by careful separation of the bladder in the manner already described. Should the bladder happen to be unavoidably injured, it is immediately sutured. Having thus completed the opening of the anterior cul-de-sac and the attachment of the bladder, the posterior cul-de-sac is opened with scissors, and the uterus and broad ligaments are explored through the opening. Any detachment from the cellular connections are here effected by the scissors. The uterus is now removed by ligation of the vessels from below upwards, first at one side, then at the other, with section of the broad ligaments. Finally, the adnexa are drawn down and the ligatures are applied outside these, as in the case of pan-hysterectomy



FIG. 160.—ANTERIOR INCISION ACROSS THE CERVIX TO FREE IT FROM THE VAGINAL VAULT UNDER IRRIGATION. (Howard Kelly.)

for myoma. The ligation and section are made as far as possible from the uterus, and any invaded glands which are found are at the time removed. If the cancer be in the body of the uterus, or has invaded it, and there is consequent enlargement, after the disinfection of the canal it may be necessary to reduce the bulk of the uterus by hemisection, and remove either half separately, or it may be reduced by a V-incision of the anterior wall. It is always necessary to prevent escape of the infiltrating neoplasm into the pelvic cavity and the peritoneum, so as to avoid the dangers of infection.

In removing a very enlarged uterus, or in cases of small vaginal outlets, it may be necessary to incise laterally the posterior commissure as far back as either side of the rectum, which will give the necessary room. I use the vaginal tap already described for irrigation (Fig. 127), aided by Martin's plan of occasional douching of the bleeding parts with a small champagne bottle. This latter washes away any clots, and quickly clears the bleeding surfaces.

Duties of Assistants—Retractors, Ligatures, Irrigation.

There is no more important duty of assistants in the operation of vaginal hysterectomy than that of the proper use of the right

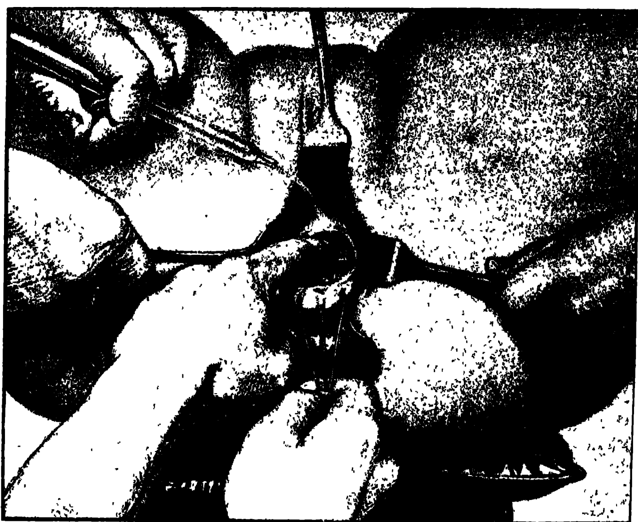


FIG. 461.—SEPARATION OF THE BLADDER FROM THE CERVIX, SHOWING THE APPLICATION OF RETRACTORS. (Howard Kelly.)

retractors during the steps of the operation. Awkward assistants prevent the proper exposure of the parts and the due protection of both bladder and rectum. The lateral retractors should be held well into the vagina at either side, holding back its walls so as to leave sufficient room for the exposure of the parts to be ligatured, the admission of the finger for exploration, and the carrying of the needles over the broad ligaments. These retractors have been figured in describing the operation for myoma.* Again, the triangular

* See pp. 504–507.

retractor of Martin should be slipped well in underneath the bladder and held securely up against the pubes, unless the operator desires its removal for purposes of exploration. The large posterior retractor is likewise held steadily, depressing well the rectum and perineum.

Another point of importance to impress on assistants is the tension to be put on *ligatures*. If they be too much drawn on, they are apt to slip and give rise to most troublesome hæmorrhage. Therefore, as soon as the part to be ligated is severed, all traction on the ligature should cease. If there be difficulty in securing a bleeding vessel, and any uncertainty remains as to its safety, it is far better to treat it by forcipressure, and leave the forceps on, than to take any chance of subsequent hæmorrhage.



FIG. 462.—DETACHMENT BY SCISSORS OF THE VAGINAL COLLARETTE. (Doyen.)

Irrigation. — The assistant who irrigates should, at the commencement of the operation, regulate the stream, which should not be too strong, but sufficient to play lightly on the part, so as to wash away the blood and keep the surface clean. The pipette should be held steadily, and turned in the direction required without the necessity of a word from the operator. There is an art also in the use of dabs or sponges. The nurse or assistant should have two or three of the clamp-sponge forceps, and these should be alternately used with the different-sized pieces of gauze, or small ready-made dabs, according as they are required. The handing of the proper-sized dab or compress, the light wiping of the part so as not to disturb ligatures, and the exercise of the proper pressure on a bleeding surface or vessel, are all

points to be carefully attended to, and are only to be acquired by practice.

Schauta adopts the plan of Auguste Martin, of suturing the peritoneum to the anterior vaginal wall, and does the same posteriorly. He also divides the uterus into two parts, in cases in which there is difficulty in removal from infiltration or adhesions. His needle-holder,* which has been already figured, is most convenient for the vaginal operation, the curve in the handle allowing it to be passed deeply at either side, while his ligature-tightener † enables him to secure the ligature at a considerable depth or high up in the pelvis. He does not cut his ligatures short, but leaves them for subsequent removal.

Doyen's Vaginal Hysterectomy in Cancer.—As regards vaginal hysterectomy, Doyen ‡ has divided his procedure into the following stages:—

'First stage: incision of the posterior fornix, opening of Douglas' pouch, and exploration of the pelvic cavity. Second stage: incision of the anterior fornix and separation of the bladder. Third stage: crushing of the lower and middle parts of the broad ligaments. For this purpose the écraseur was applied on each side for from fifteen to twenty seconds. The uterus could then be easily drawn down. Fourth stage: anterior hemisection of the uterus, either by median or by V-shaped incision, and drawing down of the uterine fundus. For a small uterus the median incision sufficed to allow the fundus and the adnexa to be brought down; for a larger tumour the V-shaped incision was employed. Fifth stage: application of a pressure forceps on each broad ligament and separation of the uterus. Sixth stage: crushing of the upper border of the broad ligament and application of ligatures. After the application of the écraseur for from fifteen to twenty seconds above the pressure forceps, a silk thread was tied in the groove formed by the écraseur. The use of the latter instrument ensured that the pedicle was relatively thin. As the threads were gradually tightened, the assistant cautiously removed the pressure forceps. A single thread thus embraced each broad ligament. Seventh stage: peritoneal toilet co-aptation of the peritoneal flaps, and tamponnade of the vagina.'

In dealing with the peritoneal flaps, Jessett catches the edges of the flaps with long curved forceps, fixing two pairs on to each flap. He draws

* See p. 507. † See p. 452.

‡ In Doyen's more recent operation he uses one of the pressure forceps and ligatures. He does not use the écraseur.

these firmly down, keeping the ends of the forceps approximated, and then packs strips of iodoform gauze tightly on each side of the flaps so as to cause the peritoneal surfaces to be brought into accurate apposition. By adopting this practice there is no necessity to unite the flaps by suturing. Should the drainage-tube be inserted, the flap is drawn well down in the same manner.

Léopold lays down the following rules regarding vaginal hysterectomy for cancer:—

'1. The anæsthetic must be given quietly by a practised hand, to prevent straining and vomiting, which easily force coils of intestine into the wound, and may cause ileus.

'2. Patients in whom the disease has spread beyond the mucous membrane into the muscular tissue are not suitable for operation.

'3. The avoidance of fouling of the wound by fæces is most important, and, should it occur before the peritoneum be opened, the operation is to be abandoned, or confined to such measures as do not open the peritoneum.

'4. There is great danger in effusion of pus into the wound from the cancerous mass (pyometra), or from inflammatory pelvic foci (ovarian abscess, pyosalpinx, etc.); such an accident requires the most minute care in the cleansing of the wound.'

Also the following corollaries are added:—'1. That the patient should be operated upon as soon as possible. 2. That the removal should be effected as widely as possible from the disease. 3. That, especially in corpus-carcinomata, no carcinomatous matter should be allowed to come into contact with the fresh wound.'

Cancer of the Uterus in Pregnancy.—As regards the question of operation for cancer of the cervix during pregnancy, the cardinal rule, Kelly says, should be, when a radical operation is possible, to do it as early as possible, in the interests of the mother. When this is not feasible, the pregnancy should be allowed to proceed to term, and the child be delivered by Cæsarian section.

Abdominal Cœliotomy for Cancer.

Howard Kelly gives the most complete description of abdominal hysterectomy for cancer. It is an operation which is seldom performed, inasmuch as most cases of cancer are more suitably dealt with by the vaginal route. Kelly gives the operation the name of the 'Ries-Rumpf-Clarke'—these three operators insisting upon the importance of removal, not only of the uterus, but also of the broad ligaments and the iliac glands, situated on and around the iliac vessels. Such an operation involves the dissection of the ureters from out the connective tissue, possibly the upper part of the vagina and the parametric tissue. These are briefly the steps of the operation:—

The ureters are first catheterized, either by Kelly's method or by that of Kollischer. This is done before the operation has commenced, though it may not be possible to pass the catheter through obstruction in the ureter from the inflammatory masses in which it is embedded. The cervix is now closed in the manner already described, by means of strong silk ligatures. A rather large abdominal incision is now made, in order to admit of freedom of manipulation during the operation. The uterus having been exposed, the ovarian vessels and round ligaments are ligated, clamps being applied on the uterine side before the round ligament is opened. The ligatures are kept well away from the body of the uterus if it be affected with cancer. The uterus is now incised as far as the opposite round ligament, and a similar process of ligation is carried out on this side. He now proceeds in the usual manner to free the lower part of the uterus from the bladder and vesical peritoneum. He seeks for the uterine artery towards its origin from the internal iliac, where it lies somewhat parallel to the ureter. The layers of the broad ligament are retracted, and the cellular tissue, as far as the pelvic floor, is separated by the handle of the scalpel. In doing this, the pulsations of the artery are felt for, and being lifted out of its bed it is carefully ligated, special pains being taken to identify the ureter at this point. As Kelly says, if we catch the ureter between the finger and thumb, its flat cordlike sensation is sufficient to enable us to identify it. It is carefully detached from the tissue, which latter is dissected down to the cervix. The large veins found on the floor of the pelvis are exposed and tied distally and proximally. Similar steps are taken at both sides. Any enlarged glands felt in the cellular tissue are dissected out along with it. The extent to which the vaginal vault is opened, and its amputation completed, will depend upon the position of the carcinoma and its extent. 'Under all circumstances,' says Kelly, 'the amputation must be made at least two centimetres below the lower margin of the disease.. Before the vagina is opened, the posterior pelvis is packed with gauze, so as to receive any discharge escaping from the wound. The vagina is opened with a Paquelin knife at a dull heat, its edges being caught, as the section is made, by artery forceps. By means of an iodoform gauze pack stuffed into it, and a gauze-pad bound round the cervix, contamination of the wound is prevented, and during the entire time the greatest care is taken to prevent the dissemination of cancerous material. Other enlarged glands are now sought for and have to be removed. Irrigation of the pelvis

with normal salt solution completes the operation, and a loose pack is pushed through the vagina and the opening into the peritoneum, so as to support the latter.

Martin divides the operation as performed by him into four steps :—

1. Ligaturing the base of each broad ligament, thus constricting the uterine arteries.
2. Opening the posterior cul-de-sac of the vagina, and the suturing of the peritoneum to the vaginal wall.
3. Opening the anterior cul-de-sac, and suturing the peritoneum to the vaginal wall anteriorly, by carrying the finger forwards at either side

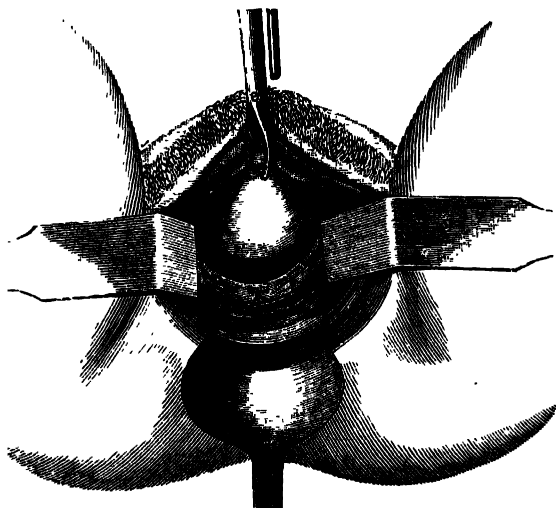


FIG. 463.—POSTERIOR CUL-DE-SAC OPENED—SUTURE APPLIED TO PERITONEUM—THE OPENING INTO DOUGLAS' POUCH AFTER THE VAGINAL WALL HAS BEEN SUTURED TO THE PERITONEUM. (A. Martin.)

of the uterus, through the opening made in the posterior cul-de-sac, and then opening the peritoneum at either side and suturing.
4. Ligaturing the broad ligaments and dividing the structures at either side of the uterus, between the ligatures and the uterine wall.

Extirpation of the Vagina.

This operation may be performed either by a perineal section, and removal through the perineum (Olshausen), or a vagino-perineal incision (Dührssens). Martin more recently has removed the entire vagina with the uterus and ovaries in a case of carcinoma. By a

circular incision at the introitus he detached the vagina. He covered the funnel-shaped wound by drawing down the peritoneum, and attaching it to the denuded surface at the hymeneal ring.

Hysterectomy by the Sacral Method.—E. Zuckerkandl and Wölffler extirpate the coccyx and the lower portion of the sacrum. A long and curved incision is made towards the left or right side for about ten centimetres in length, stretching for about three centimetres above the sacro-coccygeal articulation, the concavity of the curve being towards the left side. The coccyx, when divested of its periosteum, is extirpated. The necessary length of the sacrum is also

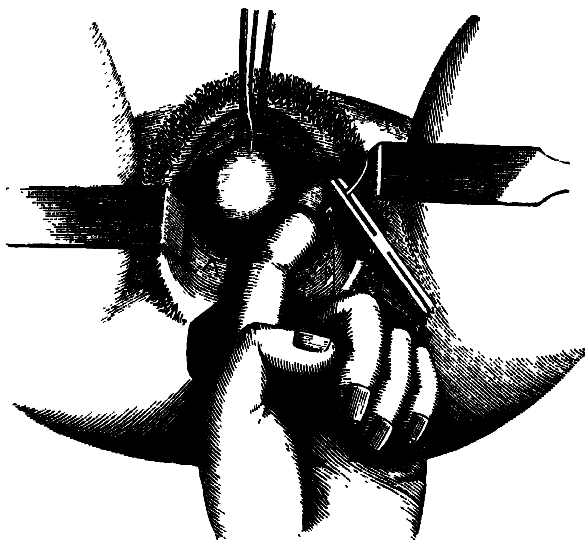


FIG. 464.—SUTURING THE LATERAL STRUCTURES IN THE PELVIC FLOOR AFTER THE OPENING OF DOUGLAS' POUCH. (A. Martin.)

removed with as little disturbance of the sacral nerves as possible. The rectum is drawn laterally, and Douglas' pouch is opened. Through this space the uterus is removed. The greatest care has to be taken to wound neither the bladder nor the ureter. Hochenegg has published the results of successful operations, where the uterus was too large to remove by the vaginal method. Hégar has modified the operation by converting it into an osteoplastic one, only temporarily resecting the sacrum and coccyx, and replacing these after the hysterectomy.

CHAPTER XXX.

AFFECTIONS OF THE FALLOPIAN TUBES.

Congenital abnormalities.

Salpingitis (acute and chronic) { Catarrhal. Interstitial. Suppurative. Tubercular. Gonorrhœal. }

Stricture.

Hydro-salpinx
Hæmato-salpinx } These three affections are regarded as the consequences of salpingitis.
Pyo-salpinx

Adhesions and displacements.

Papilloma—Carcinoma.

Tubal pregnancy.

I cannot discuss at great length certain questions connected with abnormal states of the Fallopian tubes, which have rather a pathological than a clinical interest attached to them. The names of Battey, Lawson Tait, Schroeder, and Polk are linked with many of our modern views of the consequences of Fallopian disease, and the causes of the suffering attendant upon morbid states of the tubes and associated ovarian diseases, and the later operative and conservative measures which are taken to preserve them entirely or in part. It will be widely acknowledged that Tait first established the important part played by the Fallopian tubes in perpetuating those chronic pelvic troubles which removal of the ovaries alone could not relieve.

Structure of Walls of Fallopian Tubes.

Mary Dixon Jones describes the structure of the tubal walls as consisting of—

(*a*) Six layers of smooth muscles, the principal two of which, interlaced, are circular and longitudinal, the latter being external.

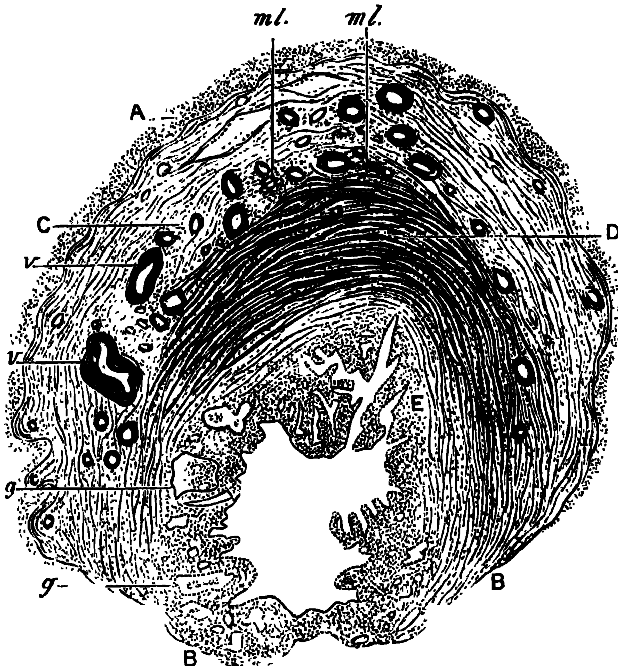


FIG. 465.—CHRONIC HYPERTROPHIC SALPINGITIS. (× 35 diameters.) A, false membranes; B, B, line of surgical section, corresponding to the middle of the broad ligament; C, fibrous bed strewn with muscular fasciculi; D, thickened bed of soft fibres, mostly circular; E, mucous membrane; *g*, *g*, pseudo-glands of cylindrical epithelium, due to the welding together of the villous structure; *ml*, longitudinal fibres.

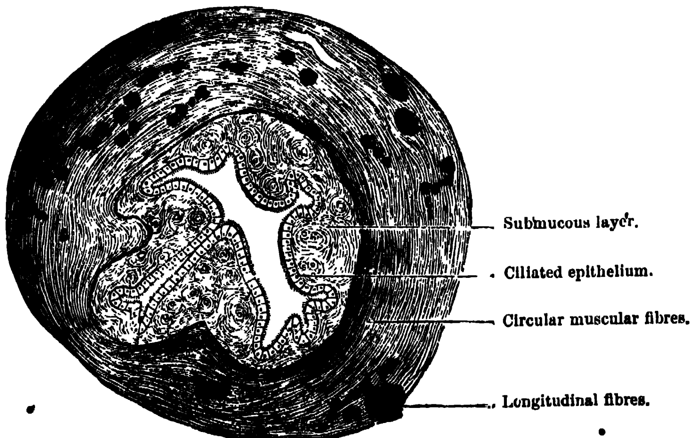


FIG. 466.—NORMAL FALLOPIAN TUBE IN SECTION. (× 10 diameters.) (Macalister.)

(*b*) Myxomatous connective tissue constitutes the inner surface of the tubal wall, and here also we find an interlacing longitudinal and circular muscle layer. The folds in the muscosa are produced by contractions and elongations of these latter muscle layers, serving to occlude the tube during life.

(*c*) A plexus of blood-vessels, arterial and venous, is found outside the longitudinal layer of the wall.

(*d*) There are also two narrow layers of oblique smooth muscle fibres, traceable from the uterine ostium to the fimbriated extremity, corresponding to the two oblique layers of the uterine parietes. These layers regulate the blood-current in the subjacent arteries and veins.

Bland-Sutton thus refers to the changes produced by salpingitis:—

'When a healthy Fallopian tube is examined in transverse section by means of a microscope, we distinguish easily the serous and muscular coats of the tube, and, standing upon these, the so-called plicæ formed by the mucous coat.



Fig. 467.—End of Normal Fallopian Tube with Ostium laid open. The plicæ are prolonged and continued to the end of the ovarian fimbriæ. The plicæ are, as Richard long ago demonstrated, elevated and ineffaceable folds of mucous membrane, like the valvulæ conniventes, excepting that they run in the long, not the short, axis of the canal in which they lie. As they pass beyond the ostium they become larger and multiply; sometimes two fimbriæ formed by division unite again. (Alban Doran.)

Each plica consists of a delicate framework of connective tissue, fringed with columnar ciliated epithelium on the free surface. Delicate strands of unstriated muscle-cells may be distinguished near the base of the epithelium, and in the middle of the fold are many capillaries. As a rule, a few leucocytes may be seen scattered among the meshes of the connective tissue. When sections are prepared from tubes which have been for some months past the seat of salpingitis, the appearances are very different. The plicæ are swollen to twice or thrice the usual size, and all the details of their structure obscured by an innumerable host of cells of various sizes. In many places the limiting epithelium is lost, in others it can be detected, disturbed, and disarranged, here and there seemingly held in position by some glutinous material. In mild cases this peculiar cell-infiltration is limited, and does not involve the whole plica, but in very diseased specimens the cells are not limited to the plicæ, but involve the muscular coat, and extend into the connective tissue of the mesosalpinx.'

SALPINGITIS.

Diagnosis.—Salpingitis is a much more common affection than is generally thought, especially during the childbearing period of a woman's life. To detect a swollen or thickened Fallopian tube, we examine the patient in the lateral and dorsal positions by the bimanual method. We can most frequently trace it from the lateral margin of the uterus outwards, and feel its more prominent portion behind the uterus and towards Douglas' pouch.

By a careful digital examination, we may detect effusions, thickening, enlargement, an adhesion, or a tumour. Such diagnosis requires experience in gynæcological examination. Tait's view, as strongly urged by him, is that, in a great number of cases, *no step save an exploratory abdominal section enables the surgeon to discover the nature of the disease.*

Exploratory Abdominal Incision in Suspected Disease of the Adnexa.

In making an exploratory incision, every antiseptic and aseptic precaution is taken before, during, and after the operation. The incision into the peritoneal cavity should be sufficient to admit two fingers. Should further enlargement of the wound be required, a finger is carried in to protect the bowel, and the scissors or bistoury is used on this, cutting upwards. No hand, save a perfectly sterilized one, should go near or pass into the wound. Search can now be made at either side, and the adnexa traced outwards from the uterus and felt. Any tumour or enlargement of uterus, tube, or ovary is quickly discovered. For further exploration of the bowel, spleen, or kidneys, a larger and differently placed incision will be required.

Owing to adhesions, a diseased Fallopian tube may be carried in front of, or over, the fundus uteri. Fixation of the pelvic contents, and the presence of the characteristic sausage-like mass at the side of the uterus, are the prominent physical signs. Inflammation and disease may cause closure of the uterine or fimbriated end, more frequently of the latter. On the other hand, the inflammatory changes may lead to a permanently enlarged and open state of either orifice. Such variations in the size of the orifices, and their relative degrees of patency, will depend on the nature of the inflammatory process and the character of the intra-tubal secretion. Often, in simple catarrhal affections, this patent state of the uterine

orifice appears to be of an intermittent nature. The serous contents of the tube may then empty themselves at intervals into the uterus, assisted by the muscular contraction of the tubal wall.

Kelly finds three kind of adhesions affecting the tubo-ovarian fimbriæ. (*a*) Simple shortening due to adhesions, restricting the area to the tube, to which the tube may apply itself to a short radius about the outer pole. (*b*) The tube is contracted down to the ovary by an obliteration of the outer portion of the mesosalpinx, so that it lies with its orifice directed away from the ovary. (*c*) The tube is flexed about the ovary with its lumen still open, and turned towards one small area to which it may be closely applied.

Classification.—Petit divides the various forms of (non-specific) salpingitis, by their anatomical and clinical differences, thus:*—

Non-cystic salpingitis	Acute	Of mucous origin.	
		Of lymphangitic origin (very rare).	
	Chronic	Mucous or catarrhal endo-salpingitis.	
		Parenchymatous	Hypertrophic and Atrophic.
Cystic salpingitis	Hæmato-salpinx.		
	Hydro-salpinx.		
	Pyo-salpinx.		

Pozzi prefers the following classification:—

Acute non-cystic salpingitis	Catarrhal.	
	Purulent.	
Chronic non-cystic salpingitis	Parenchymatous	Hypertrophic.
		Atrophic.
Cystic salpingitis	Hydro-salpinx—serous.	
	Hæmato-salpinx—sanguineous.	
	Pyo-salpinx—purulent.	

A. Martin describes but two distinct forms of salpingitis: (1) Interstitial endo-salpingitis; (2) follicular endo-salpingitis. There is a degeneration and destruction of the epithelium and muscular elements; the lumen of the tube becomes occluded in one part and extended in another; and, finally, suppuration takes place.

* 'Traité Pratique de Gynæcologie,' p. 221, par Stephan Bonnet et Paul Petit.

Ætiology.

There can be no doubt that we must look to the uterus for the source of the great majority of inflammations of the tubes and ovaries. The infection may travel through the lymphatics or the blood-vessels. It probably oftener finds its way by direct continuity through the mucous membrane. Endo-metritis, whether of a catarrhal or specific (gonorrhœal) nature, is frequently the cause. Out of 987 autopsies recorded by Galabin, Lemiere, and Winckel, in 211 there was found some affection of the adnexa. The inflammation may doubtless travel from the tube to the uterus, but the reverse is generally the case. The ovary generally participates in the inflammation in any case of severe salpingitis. Salpingitis frequently accompanies uterine inflammation, acute and chronic, and also peritoneal and pelvic cellular inflammations. Hence it commonly is a consequence of the exciting causes which predispose to these affections. It may also attend on a zymotic disease.

I have already referred to the occasional passage of the uterine sound into the tube in *dilated* or *saccular* states, and this has an important bearing on intra-uterine medication, and the bad results which may attend on it. Also, the uterine sound, if not sterilized, or if it is passed into the uterus without previous cleaning and disinfection, may directly infect the tube and cause pyo-salpinx. The opposite condition, or the one of *stricture* of the tube, is a well-understood cause of sterility. Stricture or closure of the tube may produce in it distension and accumulation of fluids. Mucus, pus, or blood may, in consequence, collect.

Distension may lead to retro-flow of the fluid or *rupture* of the tube. *Adhesions, displacements, cystic* enlargements, are also some of the remote results of inflammation, either primary or secondary, of the tubes. An unusually large accumulation of fluid is termed *tubal dropsy*. The possibility, however, of hæmato-salpinx arising at any time during the growth of the ovum in tubal pregnancy must not be lost sight of.

Alban Doran * has entered fully into the effects of closure of the ostium of the Fallopian tube by perimetritis or salpingitis. He showed that 'in adhesive perimetritis the fimbriæ of the tube are bound down by bands, which thus obstruct the ostium. In salpingitis, the ostium is obstructed, incompletely at first, by the swelling of the mucous membrane which involves the fimbriæ,

* *Transactions Obstet. Soc.*, vol. xxxi., 1889.

but permanently in other cases by great infiltration of the submucous tissue and middle coat, which swell over the ostium and cover in the fimbriæ.'

He has drawn attention to the 'crumpling up' of the meso-salpinx by inflammatory adhesions, and the consequent approximation of a distended tube to the ovary. 'Salpingitis,' he says, 'with obstruction, brings the tube and ovary into more intimate relations. The distended tube opens up the layers of the meso-salpinx until its walls touch the ovary, just as a burrowing ovarian cyst opens up the same serous layers until its walls touch the tube. A broad ligament cyst burrows in the same manner till it touches the tube above and the ovary below. This process, which may be termed the burrowing of the tube, can be readily demonstrated on an ordinary hydro-salpinx. Monprofit, who has described the process with great accuracy, terms it *le dédoublement du méso-salpinx.* The reason that the ostium is more or less permanently closed is easily explained. It is occluded either by bands of lymph which cover in the fimbriæ, or by changes within the walls of the tube, which cause much swelling, so that



FIG. 468.—COMPLETE OBSTRUCTION OF THE OSTIUM, THE RESULT OF SALPINGITIS. The end of the tube has been detached from the ovary below and the ostium forcibly opened; a bristle passes out of its orifice. The tissues of the tube have swollen over the ostium, completely concealing the fimbriæ, excepting the ovarian fimbriæ, which are seen below the bristle. Behind and above the bristle are perimetritic bands, which must not be mistaken for fimbriæ. (Alban Doran.)

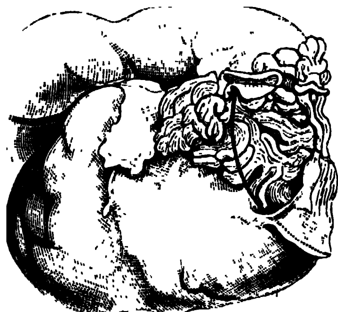


FIG. 469.—AN OVARY AND TUBE, SHOWING OBSTRUCTION OF THE OSTIUM BY PERIMETRITIC DEPOSIT, WHICH FORMS A DEEP POUCH. The fimbriæ have been partly pulled out of the pouch. A bristle passes into the pouch out of the ostium. (Alban Doran.)

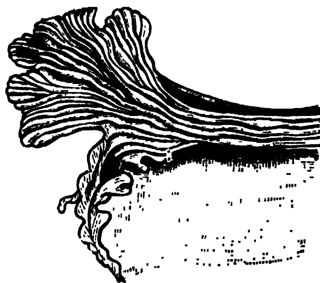


FIG. 470.—OSTIUM OF NORMAL FALLOPIAN TUBE LAID OPEN, SHOWING THE CONTINUATION OF PLICÆ INTO FIMBRIÆ, AND THE DICHOTONOUS DIVISION OF THE FIMBRÆ. The ovarian fimbriæ are well formed.

they bulge and close in over the fimbriæ. The first process is essentially a part of the pathological changes constituting perimetritis. I shall therefore term it, for the sake of simplicity, 'perimetritic closure of the ostium.' The second process is a part of the condition known as salpingitis, and may be termed 'salpingitic closure of the ostium.' As perimetritis and salpingitis are often combined, both generally take a share in closing the ostium.'

'Perimetritic closure is the simpler form. A little deposit covering the delicate fimbriæ as they lie on the surface of the outer aspect of the ovary is sufficient to bind them down, and then the ostium necessarily becomes closed as soon as the deposit is organized. In operations for chronic disease of the appendages the early stage of the process is often observed. Sometimes, on scraping away the bands of the lymph, the fimbriæ come in sight, well formed, succulent, and bright red, being full of blood. In that case little or no salpingitis is present.'

Doran approves of the principle of the operation of salpingostomy under certain conditions.* The object is to restore the tube to its function before it is lost. It does not follow because pain is absent, even after an operation in which a tube is inspected and returned, no disease being detected at that time, that the ostium may not be closed, and thus future obstruction may result.

Relation of Salpingitis to Perimetritis.

I have already, in discussing the etiology of parametritis and perimetritis, referred to the various other causes that may lead up to a combined inflammation of both ovaries and tube. In fact, *the more we know of the pathology of perimetric inflammation generally, the more obvious is it that these four affections—metritis, perimetritris, salpingitis, and ovaritis—are often correlated and consequent on each other, and that all four are frequently associated and concurrent.* Endometritis leads to catarrhal salpingitis, which in its turn is the precursor of hydro-salpinx or pyo-salpinx. The ovary is next involved, and probably becomes adherent, and a communication takes place between the parenchyma of the latter and the suppurating tubal cavity. It is rare to find the case of isolated salpingitis or ovaritis without some correlative inflammatory condition of either tube, ovary, or uterus. Hence there is good ground for Pozzi's division into *oöphoro-salpingitis,* which includes inflammation of the ovaries and Fallopian tubes; *cystic oöphoro-salpingitis,* including hydro-salpinx, hæmato-salpinx, and pyo-salpinx, as well as *cystic ovaritis,* whether of the serous, sanguineous, purulent, or lymphatic type. Also the term *perimetric salpingitis* is made by this author to include perimetritis with phlegmon of the broad ligaments cellulitis, and pelvic abscess, of which I have already spoken.

* See remarks on Conservative Surgery of the Adnexa.

General Deductions.—From all that has been observed and written on this subject I repeat that the great practical lessons we learn are: *Firstly, that, as chronic uterine inflammatory states are the frequent forerunners of inflammation of the adnexa, it is a grave error to trifle with these, and go on with expectant measures for an indefinite time in cases of endometritis of any form; secondly, that morbid conditions of the Fallopian tubes and ovaries are more frequently present than absent in perimetritis and peri-uterine phlegmon; thirdly, that all experience teaches us that the postponement of active methods of treatment—by waiting on nature and trusting to such means of cure as prolonged rest, hot douching, tampons, intra-uterine medication, or aspiration—is only putting off the time when, under much more unfavourable circumstances, operation of one kind or the other has to be resorted to.*

Pathology.*

Acute salpingitis, arising in the tubal mucous membrane, may pass into a chronic state, or, the cause being of an infective nature, such as gonorrhœal puerperal inflammation, the entire thickness of the tubal wall is quickly involved, including the connective intermuscular tissue, which becomes œdematous. Possibly a miliary abscess forms (Boldt), and finally pyo-salpinx, or it may end in contraction and sclerosis. The epithelial lining may be preserved, while the wall of the tube is thus thickened.

Endo-salpingitis.

In *endo-salpingitis* the main brunt of the attack falls on the mucous lining. This is a true catarrhal state, and may lead to suppuration. Gradually in shape and size the tube is altered, and its calibre is obstructed. The secretion it contains may be mucus or pus. Such naked-eye appearances are attended by corresponding changes in the microscopical features of the tissues. The mucous folds, thickened and reduplicated, are in parts united by exudation. The epithelial elements are disposed in irregular masses around the depressions. In the simple catarrhal state the epithelia and their nuclei are swollen. The mucous chorion is œdematous, and infiltrated with white blood-cells; the vessels are dilated and engorged. The same conditions prevail in the purulent variety,

* I am indebted to Bonnet and Petit (*lib. cit.*) for the greater part of the pathological anatomy of the Fallopian tubes.

save that there is a more active diapedesis, and the epithelial elements are separated by the transuding blood-cells.

Parenchymatous Salpingitis.

In *parenchymatous salpingitis*, which may be secondary to the acute endo-salpingitis, the lumen of the tube is encroached on; the wall becomes harder. Its fimbriated end is changed in its appearance. The advancing sclerosis gives to the mucous surface a smooth feel and look. The result is a chronic hypertrophic condition, in which pseudo-membranous lamina of tissue are formed, and fibrous layers are scattered between the normal muscular fibres. These contract the lumen of the canal, which is still further narrowed by the thickened villi, clothed with elongated cylindrical epithelium.

Chronic Atrophic Salpingitis.

In the final stage of this sclerotic change, we arrive at the form of connective-tissue development that obliterates the muscular tissue and the vessels, and greatly reduces the lumen of the tube or obliterates it altogether. This atresic state is preceded by an atrophy of the cilia, and is th. last stage of the chronic atrophic degeneration so well described by Bonnet and Petit.

Tait drew a distinction between the salpingitis that mainly affects the mucous lining (endo-salpingitis) and that which attacks the substance (parenchymatous) of the tubes. The latter is by far the more common. As a result we have severe dysmenorrhœa before and during a period; at times there is a history of gonorrhœal inflammation, a miscarriage, or a zymotic fever.

There is frequently extreme dyspareunia. I have had several such cases, one occurring in a patient in whom most severe vaginitis and metritis were induced by the forcible introduction under chloroform of a large ring pessary, which unfortunately was permitted to remain in until it had to be removed under an anæsthetic.

The sphincter-like action of the muscular fibres surrounding the uterine openings of the tube has to be remembered. Arrest or destruction of the function of these fibres has an important bearing on the entrance of fluids into the peritoneal cavity, and on the danger of intra-uterine medication. We can readily understand how the sphincter action is arrested in severe post-partum hæmorrhage, and destroyed in diseased conditions of the endometrium,

or from the growth of tumours in the adjacent muscular structure of the uterus.

Gonorrhœal Salpingitis. — Gonorrhœa and the presence of the gonococcus as a source of salpingitis is, in my belief, more frequent than is generally thought. The inflammatory consequences in the adnexa may have their source clearly indicated by the character of the inflammation which has preceded them in the urethra, vulva, and vagina. Such symptoms may follow acutely on the affection of the external genitals and the vagina, or, on the other hand, the latter may subside or be apparently cured, and the latent infection not manifest itself in the pelvic viscera until a period varying from weeks to months has elapsed, and in a great number of cases we are only led to suspect the source of the salpingitis by the character of the discharge from the uterus, which is generally virulent or profuse, and the involvement frequently of both adnexa. In other cases, however, the nature of the original affection and its symptoms have possibly been forgotten by the patient, or, in the first instance, of so mild a character that they have been overlooked, and we are confronted with a pyo-salpinx and some slight endometritic suppurative discharge in which the specific microbe may not be discovered even after repeated cultures, and yet we have, on inquiry, elicited from the husband sufficient evidence to confirm us in our suspicion that gonorrhœa is the cause of the salpingitis. The percentage of cases of pyo-salpinx due to gonorrhœa has been variously estimated, many authorities placing it at so high an estimate as 33 per cent.

Alexander Foulerton, who has devoted special attention to the bacteriology of gonorrhœa, in sixteen cases of pyo-salpinx found the micro-coccus gonorrhœa with the staphylococcus pyogenes albus and the bacilli coli communis each in two cases, and the streptococcus in one. The bacillus tuberculosis was also discovered in two cases, and in the remainder no microbe was found, Collecting the statistical results in 459 cases of salpingitis examined, he found that the gonococcus had been identified in eighty-five cases, or about 19 per cent. In about 60 per cent. no micro-organism of any kind had been identified in the contents of the tube. He accounted for the absence of the micro-organism in so large a proportion of cases by the fact that many of them did not come under observation until such a late time in the duration of the affection that the causative bacteria had died out, starved for want of nourishment or poisoned by their own excretory products.

Many cases of pyo-salpinx owed the presence of certain bacteria to secondary infection from some other cause than the inflammation in the tube, as, for example, the adhesions formed between a tube already inflamed and an adjacent portion of intestine. The gonococcus, taking only those cases in which the cause could be proved by pathological research, was present as

the causative parasite in considerably more than half such. Further, he considered this estimate as considerably less than is actually the case, if we take the light thrown on the subject by clinical observation. Uretero-vulvitis or endocervicitis, were the earliest manifestation of gonorrhœal infection. In 489 cases in which the vulva discharge was examined, the gonococcus was found in 323, that is, in about 66 per cent., whereas the organism was only found 54 times in 680 cases in which the purely vaginal discharge was examined, that is, in about 8 per cent. These statistics and observations of Foulerton's bear out the views of the majority of gynæcologists as to the potent influence of gonorrhœa in causing chronic suppurative endometritis and salpingitis, but they also bear on the very important clinical feature of the gonorrhœal infection, namely, that it is in the uterus and Fallopian tubes, rather than in the vagina, that the specific inflammation first manifests itself. This latter clinical fact had been accounted for by several authorities by the nature of the vaginal epithelium which resisted the invasion of the gonococcus. John Taylor has noticed in cases that have come under his observation the more or less frequent association of syphilis with the gonorrhœa, and, acting on this belief, he has administered mercurial treatment with a good result in several instances. Further, he favours the free opening of pus cavities without salpingo-oöphorectomy or ablation of the pyo-salpinx, limited to one side only should the adnexa of the other be healthy. The contamination of gonorrhœal pyo-salpinx by infection from the neighbouring bowel renders the case more serious.

I have said sufficient already of the methods of dealing with pelvic suppurations by posterior colpotomy to make it unnecessary to refer to posterior colpotomy again, but the determination of the best mode of reaching and extirpating a pyo-salpinx must always be determined by the local conditions found associated with it. There will ever be, as Taylor admits, cases in which the only resort left to the surgeon is hystero-salpingo-oöphorectomy, generally best effected by the vaginal route.

Salpingo-ovaritis and the Results in the Tube and Ovary.

Reymond and Magill * made exhaustive researches into the macroscopic characters of salpingo-ovaritis, the microscopic lesions of each tissue, the nature of the salpingitis produced by the gonococcus, streptcoccus, and various other micro-organisms.

Ostium Uteri.—Macroscopically, the ostium uteri was frequently found impermeable from changes in the tubal walls producing stenosis, also from external pressure, and from bends.

The Pavilion.—The ostium abdominali was closed from alterations occurring in the peritoneal covering, adhesions between the fringes,

* *Annals of Surgery*, September and October, 1896.

ending finally in obliteration of the latter, or the pavilion adhered to the ovary, its fringes spreading out over it, so that the ostium is turned away from it. They account for a tubo-ovarian cyst by the physiological predilection of the pavilion to approach an ovisac, and when an ovarian cystic collection takes the place of the latter it naturally is drawn towards it in the same manner. The time of closure of the pavilion in its relation to adhesions, and the extent to which these have formed, will influence the collection of fluid in the salpinx and its relation to the ovarian tissue.

The Ovary Cysts. In salpingo-ovaritis, the ovarian cavity is frequently transformed into a large cyst, smaller ones being disseminated through the walls. Such cysts open into the salpinx. The cysts may contain serum or pus, and this purulent formation may occur independently of any contact with the tube. The degree of duration of the ovaritis will affect both the nature of the contained fluid and the size of the communication between the tube and ovary. A localized peritonitis may give rise to an intermediary cavity between the tube and ovary.

Adhesions.—With regard to adhesions between the neighbouring viscera and the adnexa, the authors notice that the omentum may be transformed into a thick hard mass of dark red colour, and very vascular. Fatty degenerations pass into inflammatory, organized, and cicatricial tissues, and the blood-vessels give rise to thrombus and interstitial hæmorrhages. Adhesions to the intestine of the adnexa at the right and left sides are common, and such adhesions are associated with the passage of micro-organisms from the intestine, which infect the salpinx secondarily. Absorption of intervening tissues may give rise to a communication between the salpingitis and the intestine. At the right side such infection may lead to a diagnosis of primary typhlitis and appendicitis. In the same manner communications may occur between the bladder and the salpinx.

Salpingitis.—These authors classify salpingitis under the two heads of *Classical* and *Rare*. The classical would include Orthmann's division into *catarrhal*, *purulent*, *hæmato-salpinx*, *hydro-salpinx*, and *pyo-salpinx*. Cornil adds *tubercular salpingitis*, and speaks of a "*vegetating catarrhal salpingitis.*" Pozzi's classification we have already given. Under the rare forms are included the vegetating salpingitis of Cornil, which is of a parenchymatous nature, *papillomatous salpingitis* (described by Doran), follicular salpingitis in which there is an isolation of glandular cul-de-sacs, forming closed cavities at first formed in the mucous, and later on in the muscular tissue.

Nodular Salpingitis has by different authorities been looked upon as myoma of the salpinx. In such cases the lumen of the tube is contracted, and the myomatous change is found immediately outside it, the ordinary disposition of the muscular fibres being lost, while cysts are found disseminated through the muscular tissue, or the latter is replaced by fibrous tissue. This admixture of muscular and cystic degeneration occurs in varying degrees of intensity in the thickened walls of the tube. Such cystic and muscular degeneration gives place in parts to fibrous change, and, consequently, we find these muscular cystic and fibrous transformations invading the mucous membrane. Thus we see how a mixed form of degeneration may thicken the walls of the tube and contract its lumen.

*Calcification of the Adnexa in Pyo-salpinx.**

Ries of Chicago (*Zeitschrift f. Geb. u. Gyn.*, 1899) has reported three cases of calcified pyo-salpinx and hyo-salpinx. They consisted of fibrous matter, fat, cholesterin, carbonate and phosphate of lime and magnesia. They are possibly due to retrograde metamorphosis in the corpora lutea, or from cysts of these.

Alban Doran has published an interesting case of hæmorrhage from the Fallopian tube without evidence of tubal gestation.†

The tumour was removed as a reddish-brown solid mass, into which the right Fallopian tube appeared to run. It was adherent posteriorly to the sigmoid flexure and rectum. The left adnexa were healthy. The tumour formed a pyramidal mass with convex surfaces. The apex was firmly incorporated with the fimbriæ of the tube above the ostium; the base measured $2\frac{1}{2}$ inches. The interior appeared on section as solid coagulum, old and firm towards the base, soft and recent at the apex, which lay close to the tubal ostium. The fimbriæ of the tube were normal, the canal showed no sign of dilatation or inflammation, and the ostium was not dilated. The mesosalpinx was perfectly free from any abnormal condition. The ovary was large, two inches in vertical, and an inch and a half in transverse diameter. On its cut surface were several follicles about an eighth of an inch in diameter, full of half-decolorized clot, but a corpus luteum was not found (Fig. 471).

Alban Doran at first suspected tubal gestation, but the tube was perfectly healthy, and the disturbance recent, while the ostium was

* Bland-Sutton showed at the Obstetrical Society an interesting case of an ovary which contained a calcific mass projecting from the wall of the cyst, and which contained an incapsuled, lobulated piece of hard bone like tissue, similar to those masses which are found in old uterine myomata.

† *Obstet. Trans.*, vol. xl., p. 182.

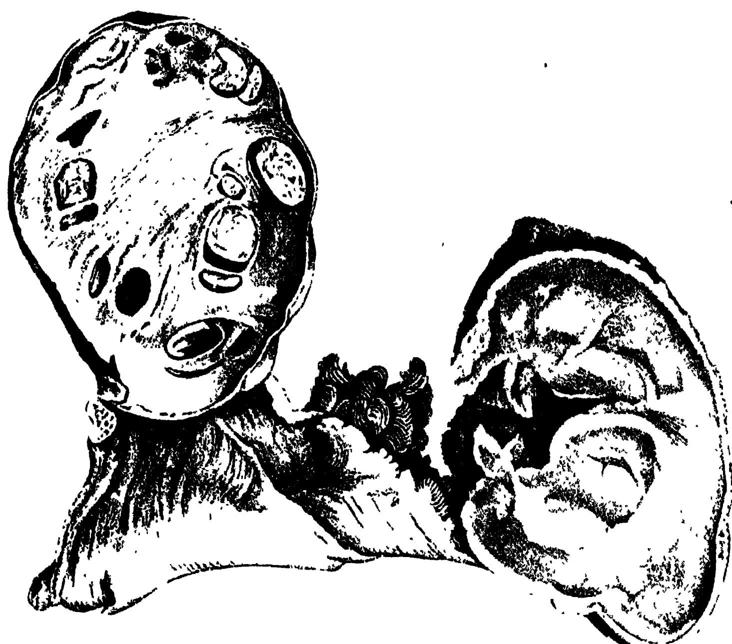


Fig. 471.—Hæmorrhage into Fallopian Tube not due to Ectopic Gestation. (Alban Doran.) See text for description.

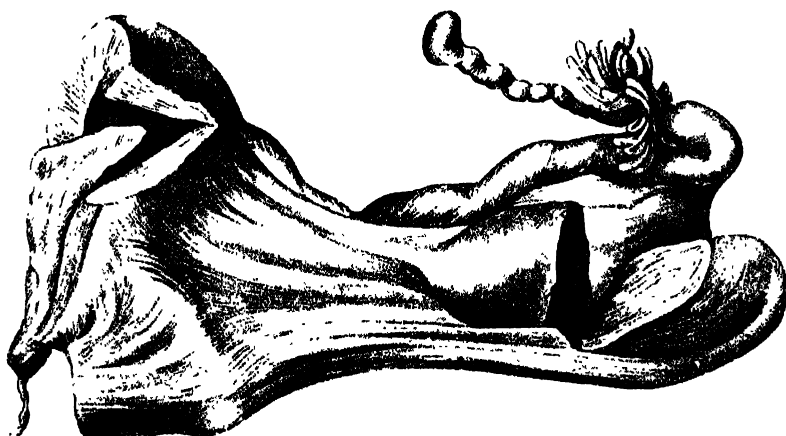


Fig. 472.—Hæmorrhage into Uterine Cavity and Fallopian Tube not due to Ectopic Gestation. (Griffiths.) See text for description.

not dilated, neither was there any sign of obstruction which might have given rise to a hæmato-salpinx. At the same time, he referred to Griffith's specimen (Fig. 472), in which the pelvic organs were removed from a nullipara aged 18, who died from uncontrollable epistaxis and menorrhagia. A vermiform clot hangs out of the ostium. A blood-clot which was contained in the uterine cavity extended along the Fallopian tubes, projecting at the right side beyond the fimbriated extremity. In this case the peritoneum was normal, and no blood had escaped into its cavity. Here also there was no evidence of ectopic gestation.

Accessory Ostia and Cysts of Meso-metrium.

I recently showed this specimen at the Gynæcological Society, of which the following is the pathological report by Mr. Targett.

Right Uterine Appendages.—The Fallopian tube, its ostium and fimbræ, were normal. Attached to the posterior surface of the meso-salpinx were

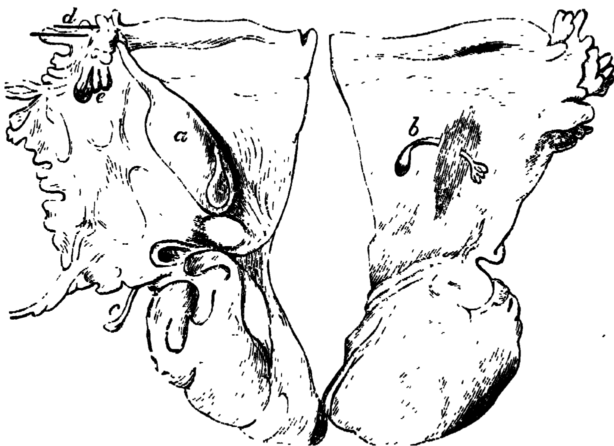


FIG. 473.—OVARIES: MESO-METRIA AND FALLOPIAN TUBES VIEWED FROM BEHIND. (*b*) Right meso-salpinx showing pedunculated cyst resembling hydatid of Morgagni (persistent end of Wolffian duct); accessory Fallopian tube (cyst in ovary not seen on the anterior surface); (*d*) three distinct ostia of left Fallopian tube; (*a*) cyst with pedunculated cyst springing from it, similar to that at the right side; three other small cysts are in this meso-salpinx (*vide* text), one (*c*) pedunculated. (Author.)

two pedunculated bodies nearly half an inch long. The extremity of one of these bodies was dilated into a small cyst, so that it resembled a hydatid of Morgagni. The other body had a stouter pedicle, became dilated towards its free extremity, and terminated in a minute ostium and fimbriæ. A bristle

could be inserted into the ostium for about an eighth of an inch. The body had, therefore, the structure of an accessory Fallopian tube. The seats of attachment of these pedunculated bodies were very close together, and corresponded in position with the horizontal tubules of the parovarium; their development was probably associated with these tubules, and the fimbriated body might be regarded as the persistent end of the Wolffian duct. The ovary showed much wrinkling of its surfaces at the upper pole, but the rest of the exterior was smooth and healthy. On section, an oval thick-walled cyst was displayed, which measured an inch in chief diameter. It contained a little blood-stained fluid, but had ruptured during removal, hence the greater part was lost.

Left Uterine Appendages.—The Fallopian tube and its fimbriæ were healthy; there were three distinct ostia leading out of the ampulla. The fimbriæ on the edge of the meso-salpinx were numerous, but appeared healthy. Between the layers of the meso-salpinx there were four small cysts. The largest had an elongated outline, its long diameter measured nearly one inch, and was placed almost at right angles with the axis of the Fallopian tube. From the surface of this cyst sprang a small pedunculated cyst like a hydatid of Morgagni, and this resembled the structure described in the right appendages. The remaining two cysts in the meso-salpinx were the size of a pea; they did not seem to be connected with the vertical tubules of the parovarium, one being close on the edge of the meso-salpinx, and the other crossed by these tubules, but with regard to the elongated cyst, the abdominal end of the horizontal tubules might be traced up to it. Hence it could have arisen in connection with the extremity of the Wolffian duct.

The naked appearance of the left ovary did not differ materially from that of the right. Its surface was less wrinkled, and on section a similar cyst was to be seen at one end of the organ. This had ruptured during removal. There was another small cyst in the substance of the ovary.

With regard to these hydatids or cysts of Morgagni, Bland-Sutton says—

'This term is applied to a small-stalked cyst attached to the fimbriæ, and in some instances to the tube itself. It is rarely larger than a pea. Sometimes it is represented by a tuft of fimbriæ supported on a long pedicle. Occasionally the pedicle of the cyst is furnished with a small tuft of fimbriæ. The true hydatid must not be confounded with stalked cysts, so frequently found associated with the parovarium. Ballantyne and Williams have carefully investigated the frequency with which the true "hydatid" is present. They found stalked cysts present in 75 per cent. of specimens examined. The true Morgagnian cyst was present in 8 per cent. in adults, and in 27 per cent. of fœtuses and infants. The total number of tubes examined was ninety-four pairs from adults, eleven pairs from fœtuses, and five pairs from children. There are structural differences between the two forms. According to Ballantyne and Williams, the true Morgagnian cyst "is lined by a mucosa with simple folds, covered by a single layer of ciliated columnar epithelial cells; its wall is always composed of muscular fibres, arranged circularly and longitudinally; its outer membrane is the peritoneum; its stalk is always muscular, and its contents consist of clear liquid fluid; whereas, the small pedunculated cysts of the parovarium have fibrous stalks and walls; the

inner walls of such cysts are lined by cubical epithelium." "With regard to the *pedunculated accessory fimbriæ*," the same authors say, "they are probably derived from Kobelt's tubes. When describing the parovarium, attention was drawn to the pedunculated cysts so frequently found at its outer end, known as Kobelt's tubes. Some of these small cysts rupture, and, instead of a stalked cyst, we find a pedunculated tuft of fimbriæ." The cysts sometimes appear as if growing from the wall of the tube, and I have little doubt that the stalked tufts of accessory fimbriæ originate in similarly displaced Kobelt's tubes.'

Hydro-salpinx.—This distension of the Fallopian tube with serum must be kept distinct from those thickened conditions I have referred to, in which temporary collections of fluid occur in the

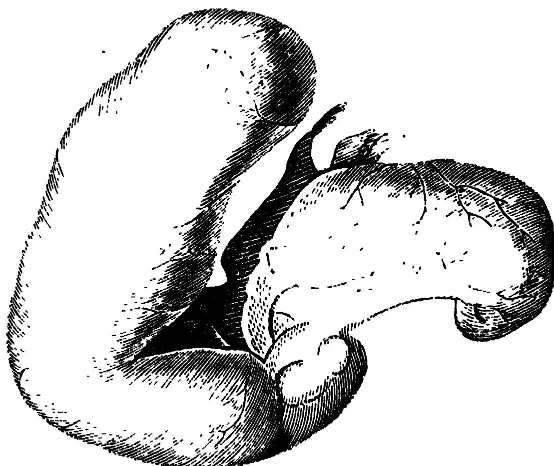


FIG. 474.—HYDRO-SALPINX WITH CYSTIC OVARY ATTACHED (after oöphorectomy in a case in which a large cystoma of the left ovary was removed). (Author.)

sacculated tube, or when an ovarian cyst communicates with the tube of a tubo-ovarian cyst. The latter condition reaches far greater dimensions than does a hydro-salpinx, and hence the confusion which has arisen as regards the occasional size to which a hydro-salpinx may extend. The probability is that every case of hydro-salpinx is the sequel of a salpingitis which is arrested in the serous stage of the inflammation, and does not pass beyond it into a pyo-salpinx. The average size of a hydro-salpinx is about that of a medium-sized egg or pear. It is ovoid in shape, and smooth; its walls are thin and almost transparent in parts. The fluid is clear or pale yellow in colour. Floriep has divided hydro-salpinx into two varieties, according as the internal orifice of the

tube is closed or open. Tait attributes the cystic tendency in the Fallopian tubes in many cases to an arrest of development of the oviduct, which is in part obliterated.

Kelly divides, for clinical purposes, hydro-salpinx into *hydro-salpinx simplex, hydrops tubæ profluens, hydro-salpinx follicularis,* and *tubo-ovarian cyst.* In the first variety the tube, transparent and thin-walled, may hold fluid in varying quantities to the extent of a litre. It then somewhat resembles a parovarian cyst. Adhesions attach the ampulla to the ovary or the pelvic wall. The muscular wall is generally thinned out. The mucous folds are branched, separated from each other, and there are finger-like projections. The cilia may or may not be retained. Kelly found a calculus in one case projecting into the lumen of the tube. In hydrops tubæ there is an outflow from the tube into the uterus and vagina, which escapes at the vulva. The quantity of discharge varies—sometimes it is considerable in quantity, accumulates in the vagina at night, and is spontaneously ejected on rising. In follicular hydro-salpinx a section of the tube shows the central lumen surrounded by several small or irregularly shaped cavities, separated by dissepiments. The larger cavities are lined by cuboidal epithelium, the smaller one by cylindrical cells.

In the case of tubo-ovarian cysts there is a communication between the dropsical tube and the ovarian cyst. The former ends in a bulbous enlargement, varying in size. The fimbriated end of the tube is often found spread over the inner wall of the cyst.

Hæmato-salpinx.—As in the instance of the serous cystic distension, so hæmato-salpinx is to be regarded as a true cystic distension of the Fallopian tube with blood. It is not a mere transitory effusion which escapes or is absorbed, and it should, strictly speaking, be kept quite distinct from the blood which escapes in a ruptured tubal pregnancy, though still to the latter some authors apply this term. Nor is the possible detention of blood in the tube (the consequence of a congenital atresia of the vagina or uterus) to be confounded with true hæmato-salpinx.

Tubal Apoplexy.—Pozzi divides hæmato-salpinx into two principal forms, according to their etiology. The first he attributes to an *apoplexy of the tube,* following upon catarrhal congestion, or on menstrual suppression and irregularities. These are those more temporary swellings which occur in previously thickened and altered tubes. They are generally reabsorbed after a short time, leaving the tube in its original changed condition. The sanguineous effusion

may occur from the mucous lining of the tube. This has been many times insisted on by Tait. Thus, the tube, when fixed in the pedicle in the abdominal wall after ovariotomy, has been seen to bleed during the time of a menstrual period. Pressure from uterine myomata or intra-ligamentary tumours may also cause bleeding into the tubal cavity, and this may assume the cystic form.

Hæmato-cystic Hæmorrhage.—The second variety described by Pozzi is characterized by the presence of a sac. This sac he looks

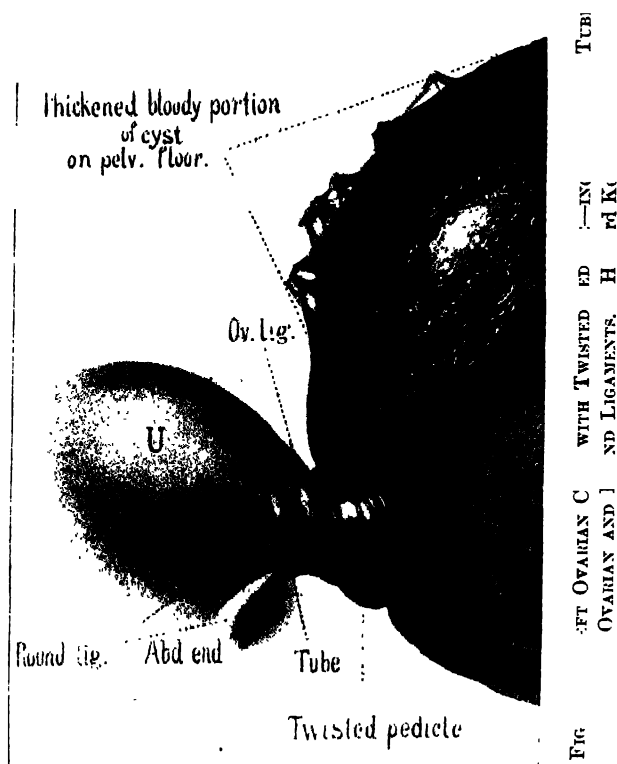


FIG ... :FT OVARIAN C ... WITH TWISTED ... ED :—IN ... TUBE
OVARIAN AND ... ND LIGAMENTS. H ... rd K...

on as a tubal pregnancy arrested in its development, followed by the death of the embryo, which is reabsorbed; or it may be that there has been a pyo-salpinx which has obliterated the outer orifice of the tube, and in this pathological cavity, incapable of reabsorption, the blood is effused. At times, Pozzi says, this transition may be direct from a pyo-salpinx to a hæmato-salpinx, or there may be an intermediate stage in which, after hydro-salpinx, the sanguineous

effusion occurs. The sac may vary in thickness in different parts, and the fluid differs in consistence, dependent upon the cause of the effusion. The mucous lining is generally thickened, and its surface in parts is crowded with engorged capillaries, the fusiform cells covering which are devoid of epithelium (*lib. cit.*).

Twisted Fallopian Tube and Infarcted Hydatid.

W. W. Russell, of Johns Hopkins Hospital, recorded an interesting case * of hæmorrhagic infarction of the Fallopian tube due to (1) a cystic formation in the tube; (2) distortion from adhesions and rotation of the pedicle of the cyst. Cœliotomy was performed by Howard Kelly, after a succession of attacks of abdominal pain and vomiting. At both sides the ovaries were adherent to the pelvic wall. The right Fallopian tube was turned upon itself, so that the ampulla rested against the posterior side of the isthmus and

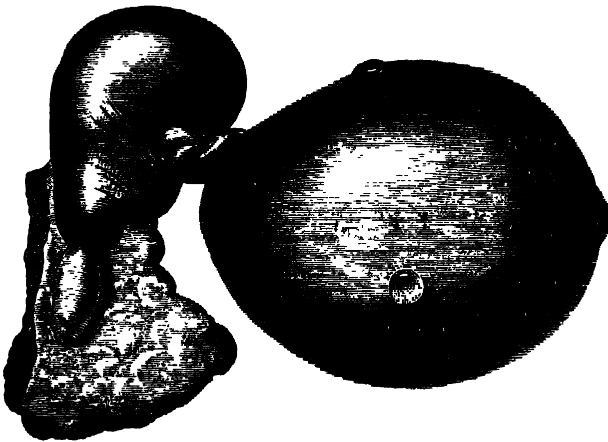


FIG. 476.—INFARCTED HYDATID TO RIGHT, WITH CONSTRICTED PEDICLE AT ITS LEFT EXTREMITY. INFARCTED FALLOPIAN TUBE ABOVE TO LEFT; OVARY, WITH NORMAL UTERINE END OF TUBE OVERLYING IT, TO LEFT BELOW THIS. (The drawing three-fourths natural size.)

meso-salpinx, the tube being patent except at the fimbriated extremity. A process of necrosis had set in, rendering the tissue soft, friable, and of a dark-red colour. A pedunculated mass, two centimetres in length and five millimetres in diameter, sprang from the buried fimbriated end of the tube, its pedicle being twisted from left to right. The mass measured 6 × 6 × 4½ centimetres, and its surface was of a smooth and brownish-red colour. It contained clear serous fluid, its walls being two millimetres in thickness.

* *Amer. Jour. of Obs.*, vol. xxx., 1894.

The microscopical examination proved that there had been hæmorrhage into the tissues.

Pyo-salpinx—Causation.—The purulent collection may follow catarrhal salpingitis, and is generally found at the outer end of the



Right sac ruptured in removal — size, larger than a cricket-ball; left remained intact—size of a goose's egg; tubes thickness of thumb.

Fig. 477.—Case of Double Pyo-salpinx with Enlarged Bladder reaching to within Two Inches of the Umbilicus, and Secondary Renal Complications. Abdomen Twice Re-opened. Complete and Permanent Recovery.* (About one-third natural size, posterior surface.) (Author.)

tube. The character of the purulent fluid varies considerably. It is generally crowded with epithelial cells. The more frequent causes of purulent inflammation of the tube are septic conditions started

* *Obstet. Soc. Trans.*, vol. xxxix., p. 319.

by uterine operations, the use of the sound, gonorrhœa, and those other septic states which follow on abortion and miscarriage. Attempts at criminal abortion by rude hands frequently cause these suppurating affections of the tubes and ovaries.

Pathological Changes.—The outer extremity of the tube may be closely adherent to an ovary, and this is the more usual condition. Adhesions may attach the tube and ovary to the peritoneum in Douglas' pouch, or to the rectum or uterus. The appendages on both sides are generally involved, especially in gonorrhœal salpingitis. This is an important clinical fact to remember in the treatment of pyo-salpinx. The thickness of the suppurating cyst-wall varies. Such a suppurating cavity, contracting adhesions with the rectum or bladder, may burst into either. The pus is generally thick and creamy, and fœtid if the cavity be close to the rectum. This contiguity of the sac to the ovary leads generally to the involvement of the latter, which in its turn becomes purulent, though the suppurating process may have begun in the ovary. This involvement of the broad ligament and ovary is more likely to occur by a spreading of the suppurative process if there be

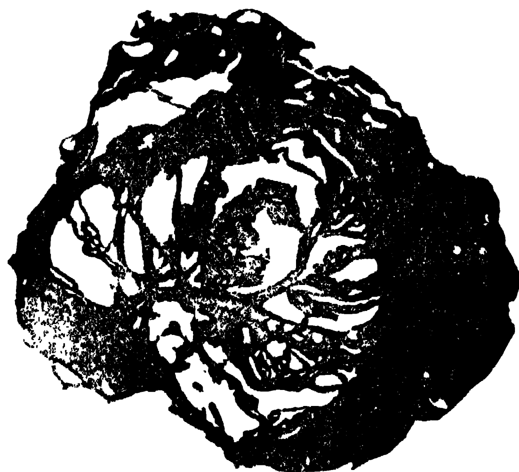


FIG. 478.—FALLOPIAN TUBE. Removed for Pyo-salpinx by Professor Landau in my presence, and mounted (stained) within 12 minutes by Dr. Ludwick Pick.*

* Ludwick Pick uses Jung's Hobel microtome (Leitz, Dorotheen Strasse, Berlin). Sections having been made are transferred to 4 per cent. formalin solution for 3 to 4 minutes. Next they are transferred to 4 per cent. of carmine and 5 per cent. of alum. They are then placed in water for a few seconds, and then in alcohol, 80 per cent., for ten seconds; after this in absolute alcohol for a few seconds, and finally in carbolized xylol (one xylol to three of carbolic acid).

a pre-existing cystic condition of either of these. The wall of the pyogenic cavity is greatly thickened, and has in an exaggerated form all the pathological characteristics of catarrhal salpingitis of the chronic type (infiltration of embryonic and fusiform cells), while near the surface of the mucous lining the cell-growth is so abundant as to have the appearance of granulation tissue.

The patient from whom I removed the adnexa shown in Fig. 477 consulted me in July, 1897. She was then suffering from an over-distended bladder and partial incontinence. At her first visit I drew off five pints of urine by the catheter. At that examination, and subsequently during anæsthesia, a hard mass was found filling the pelvic brim and pushing the uterus upwards out of the pelvis. The retention had been brought about by unavoidable over-distension of the bladder some three weeks previously to my seeing her. She had never at any time before complained of pelvic symptoms, nor had she suffered pain. There had been frequent recurrent malarial attacks, first contracted in the tropics. During the first week she was under observation she passed daily from six to seven pints of limpid urine, sp. gr. 1010, and there was a slight deposit composed entirely of pus. There were some hyaline casts present. After undergoing treatment, with the object of reducing the quantity of the urine, she was operated upon on the 20th of August, when oöphoro-salpingo-hysterectomy was performed. The sound passed into the bladder before operation reached to within two inches of the umbilicus. The operation was extremely difficult, owing to the mass of adhesions at either side and the large size of the pus sacs, the right one being larger than a cricket-ball, and the left of a goose's egg. The tubes also were enormously thickened. The iliac vessels were bared by the stripping off of the capsule for some distance at the left side. The uterus was removed with the adnexa by the intra-peritoneal operation. The drainage was made through the abdominal wound from the pouch of Douglas. The kidneys were examined, and the right found to be enlarged.

The course of the case was at first most satisfactory, and nothing untoward occurred until after the sutures were removed, when the temperature again rose, and a swelling gradually occurred in front of the rectum, pressing into the vagina. This was opened, the pus evacuated, and a drainage tube inserted. The temperature fell, and remained normal for some time, rising again at the end of ten days. Being uncertain as to the cause of the hyperpyrexia, and the possibility of some pus being yet concealed at either side, the pelvis was again explored through the abdomen one month after the last exploration, but nothing could be detected. The urine still contained some pus.

From this time the patient progressed most favourably. She is in perfect health at the present time (January, 1900).

Mary Dixon Jones, writing to me on the subject of pyo-salpinx, says: 'A fact that I have found out by careful microscopical investigation of many tubes, and which I have repeatedly verified in many different specimens, by high and low powers of the microscope,

is, that in pyo-interstitial salpingitis, not only is the mucosa of the tube wall destroyed—every normal anatomical element—but the tube wall itself, the different layers of muscle fibres that form it being, in some cases, completely destroyed by inflammatory action. In some instances, I have found that in portions of the tube wall, not a muscle fibre is left, the whole, or portions of the tube wall are reduced to a mass of inflammatory corpuscles, in some instances verging on suppuration or abscesses. Thus the normal structure of the tube wall is destroyed, and the tube is no longer capable of performing its special physiological functions.

'If we can imagine such inflamed and suppurating tubes "cured," it can only be that the diseased structure is replaced by fibrous connective tissue; and fibrous connective tissue cannot perform the functions of muscle fibres. Besides, this newly formed fibrous tissue frequently seems to have a tendency to take on new inflammation, or break down into an inflammatory corpuscle, followed by suppuration. I have seen repeatedly in many tubes this new fibrous tissue breaking down into inflammatory corpuscles, inflammation and suppuration.'

When there is a bad case of pyo-interstitial salpingitis, she does not believe the Fallopian tubes can ever after be made to perform their normal functions. 'They are only a source of disease and infection for the whole system.'

Symptomatology.—Pyo-salpinx occasionally does not manifest itself by the presence of any marked pyogenetic symptoms. On the other hand, pain may be intense, there may be great bladder distress and pain in urination, and all attendant symptoms of perimetritis may be present, such as previous rigors, hyperpyrexia, and intense abdominal tenderness with tympanites. In the case of *gonorrhœa*, there may be associated local signs, in the vulva, urethra, and vagina, of the gonorrhœal infection. Also difficult and painful defæcation may be the consequence of an accumulation in the pouch of Douglas, which presses on the rectum, and involves the peritoneal reflexion. The fear of pain will then deter the woman from permitting the movement of the bowel. Reviewing all the symptoms of the gonorrhœal attack, we are assisted in arriving at a conclusion as to the cause by the mode of onset of the inflammation, the more localized character of the pain, the history and proofs of a recent gonorrhœa, and the absence of those signs which are generally characteristic of septicæmic peritonitis. Also, we are assisted by negative proofs of no abortion or miscarriage having occurred, and no gonococci

having been found in the secretions. Taken altogether, the attack of sepsis is more acute, virulent, and painful, and the constitutional symptoms are far more pronounced.

Pus may collect in one or both of the Fallopian tubes, and be encapsuled in them, or it may be found in an abscess cavity common to both the tube and ovary. It may also collect around the vermiform appendix, and find its way into the adjacent tubes. In the purulent collections are found either the gonococci, the streptococci, or the staphylococcus—the latter being comparatively rare; and still more rarely are the mixed infections due to the presence of different micro-organisms. The contiguity of the left tube to the rectum is not to be forgotten, and the possibility of infective bacteria

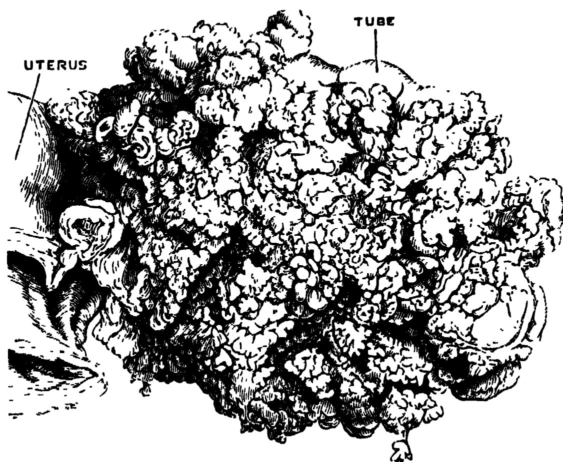


FIG. 479.—PAPILLOMA OF THE OVARY, INVOLVING THE BROAD LIGAMENTS. The drawing shows the growth at one side only; the other ovary and ligament were similarly affected. (Alban Doran.)

travelling from the former to the latter; this more especially if there be adhesions between the rectum and the adnexa, or an abscess between the tube and rectum.

The important practical bearing of our knowledge of the causation and course of a pyo-salpinx is to enforce these lessons: (*a*) *pyo-salpinx is frequently found in both tubes;* (*b*) *it often involves the ovary in a tubo-ovarian abscess;* (*c*) *if it increase it may become attached by adhesions to the uterus, and rupture into it, or to the rectum, and burst into it, or possibly involve the bladder and open into any of these viscera;* (*d*) *the suppuration may be of a tuberculous nature.* Remembering this latter factor, we must be careful to inquire

into the family history for any corroborative evidence in hereditary predisposition to tubercle, and the presence of the disease in other organs, remembering that the tuberculosis is most probably found at the same time in the uterus and ovary.

Papilloma.—Papilloma of the Fallopian tube appears to have an inflammatory origin. It may proceed till large masses of papillomata develop, these growths being perfectly innocent, although they may even provoke ascites and hydrothorax. On the other hand, the papillomatous vegetations may undergo malignant degeneration.

Papilloma of the Fallopian tube is very uncommon. Rokitanski and Hennig described outgrowths from the papillæ seen on the mucous membranes of diseased Fallopian tubes, the latter authority noticing certain transitional stages of growth—warty, papillary, and polypoid—which are often seen side by side in dropsical tubes (Doran).



Fig. 480.—Primary Carcinoma of Fallopian Tube. *a*, fimbriated extremity; *b*, ovary; *c*, mass of carcinoma invading wall of tube; *d*, uterine end of tube; *e*, limit of new growth towards uterine end of tube; *f*, masses of new growth filling and distending the tube.* (Hubert Roberts.)

Alban Doran exhibited a large papilloma of the Fallopian tube presenting such papillary outgrowths at the Pathological Society of London.† In this particular case ascites and pleuritic effusion were associated with the papilloma. Cauliflower excrescences grew from various parts of the mucous membrane of the dilated tube. Amidst these here and there were cysts with papillary outgrowths.

Hubert Roberts has published two cases of primary carcinoma of the Fallopian tubes. In the first there were repeated discharges of sanious fluid per vaginam, preceded by pain, and there was also more or less a continuous watery discharge, a leakage from

* *Obstet. Soc. Trans.*, vol. xl. † *Trans.*, 1890.

the tube. The growth was of a papillomatous nature, and entirely filled and distended the lumen of the tube, save within one inch of its uterine ostium, which was patent and healthy. The fimbriated end was closed. In the second case the tumour was removed by Meredith. It also was of a papillomatous nature. At its junction with the uterus the tube was healthy. There were no secondary deposits in the peritoneum. In both cases recovery was complete, nor had there been any symptoms of recurrence up to the time of their publication.

In this second case of primary carcinoma of the Fallopian tube (Fig. 481), there was the condition of hydrops tubæ present, and the patient's attention was first directed to curious cherry-coloured watery discharges from the vagina, the result, apparently, of closure

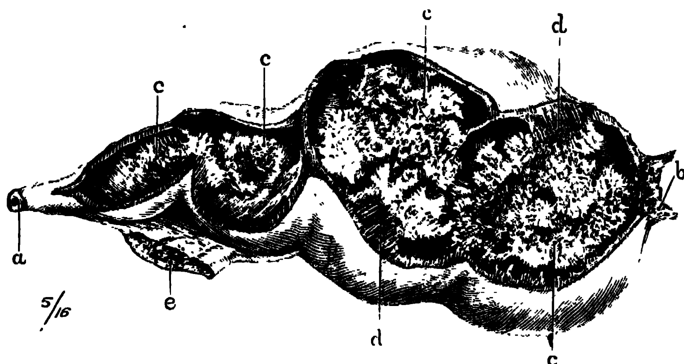


FIG. 481.—PRIMARY CARCINOMA OF FALLOPIAN TUBE. Dr. Roberts's second case. (½ nat. size.) *a*, uterine end of tube; *b*, fimbriated extremity; *c*, *c*, mass of papillomatous growth undergoing degeneration; *d*, *d*, solid portions of growth involving wall of tube; *e*, remains of mesosalpinx thickened.

of the abdominal ostium, the accompanying distension of the tube being associated with great pain. The disease recurred within eight months of the operation, and death resulted within thirteen months.

'The sections show a very advanced papillomatous condition which springs from the wall of the tube. The normal plicæ are very much exaggerated and their contour lost; the epithelium consists of large columnar cells of irregular shape, and the deeper layers and walls of the tube are involved by similar irregular clusters of carcinomatous cells gathered in irregular lacunæ and spreading into the connective tissue beneath; there are degenerative changes in the superficial portions of the growth.

'The involvement of the deeper portions of the tissues by the carcinomatous cells is everywhere evident.

'The growth is limited strictly to the tube itself, which is generally affected.' * (Kanthack's report.)

Primary carcinoma of the Fallopian tube is a rare disease. It occurs near the menopause, and is accompanied by vaginal discharge, generally sanious. Its course is apparently slower than that of cancer in most other organs, certainly far less rapid than in ovarian cancer. Evidence as to the origin and precise nature of sarcoma of the Fallopian tube is as yet very scanty.

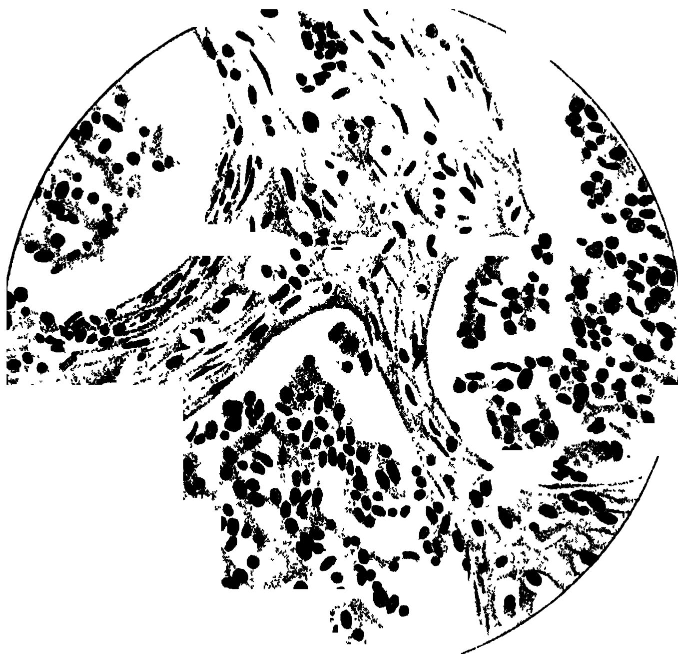


FIG. 482.—PRIMARY CARCINOMA OF FALLOPIAN TUBE.† (Hubert Roberts.)

Alban Doran has collected the particulars of twenty-six cases of primary carcinoma of the Fallopian tube.‡ Looking at these cases, I find that they were thus distributed as to age: From 55 to 60 years inclusive, seven; 50 to 55, three; 45 to 50, twelve; 40 to 45, three; 35 to 40, one; total, 26. The right tube was affected in eleven cases, the left in four, both in nine, unrecorded in two. Eight women of those affected were sterile, seven had had one

* *Obstet. Soc. Trans.*, vol xl.

† *Ibid.* ‡ *Ibid.*

child, two had aborted, three were mutipara. There was present in nine a sanious and serous, or a watery, discharge. In two cases the discharge was described as 'yellow,' in one it was metrorrhagic, in two hæmorrhagic, in one it was purulent and acrid. Looking to the nature of the malignant disease, we find in fifteen cases the character of the tumour was distinctly papillomatous cancer, in three it was medullary, in one villous epithelioma, in another cylindrico-epithelial villous carcinoma. The precise character of the cancer is not stated in the other cases. Either the uterus, peritoneum, or intestines are noted as being involved in seven of the cases; the pelvic, lumbar, or inguinal glands, were involved in three; the ovary as well as the tube was invaded by the cancer in three cases. The results of operation as revealed by these cases are not encouraging, recurrence taking place in the great majority, the longest period being one in which the patient is said to have been "alive and free from recurrence one year and seven months after operation." There can be no doubt, as Doran maintains, that for such cases, if the diagnosis can be fairly made beforehand, abdominal cœliotomy is the best route, as affording freer scope for examination of the diseased parts, and enabling the operator to deal more completely with the area of the cancer.

Tubercular Salpingitis.—The relation of tuberculous inflammation of the Fallopian tube to pelvic peritonitis is a point of considerable practical importance.

In cases in which there is tuberculosis of the pelvic organs, we have frequently associated tubercle of the peritoneal cavity. In such cases tubercular nodules may be disseminated over the peritoneum. There is then associated peritonitis with thickening of the peritoneum, and possibly collections of blood or serum, or shreds of lymph with adhesions in the peritoneal cavity. In other cases, pus may accumulate, while there are adhesions of the intestines, and the extremely thickened peritoneum may have the appearance of a sac, and has been mistaken for such. This general peritonitis of tubercular origin may spread from the uterus and adnexa. These organs in such cases appear to be studded all over the peritoneal surfaces with fine tubercular nodules. The period of life at which we are most likely to find tubercle of the adnexa is between the ages of twenty and forty-five; the years between twenty-five and thirty-five being the ones in which the liability to tuberculosis appears to be the greatest.* It must be remembered that patients

* See statistics of Osler, *Johns Hopkins Hospital Reports*, vol. ii., No. ii., p. 70.

frequently do not bear in their appearance or physique any evidences of the disease, as it has been found in the adnexa of women apparently in robust health. Pain also may be absent, and the temperature may not be to any great degree affected, though when the disease has advanced to a certain stage, then exacerbations of temperature varying in degree are noticed. Vesical symptoms, associated with painful micturition, are not uncommon. The liability of the adnexa to tubercular inflammation as well as its insidious and obscure character, indicate the importance of a careful examination in all cases in which adnexal trouble is suspected, and the submission of a discharge or scraping to microscopical as well as



FIG. 483.—TUBERCLE OF THE FALLOPIAN TUBE, SHOWING GENERAL ENLARGEMENT OF THE TUBE, BOTH IN LENGTH AND BREADTH, WITH IRREGULAR DILATATIONS, CORRESPONDING TO DEEP ULCERS ON THE INNER SURFACE, FILLED WITH CASEATING TUBERCLE. Miliary tubercles are seen on the peritoneal surface, chiefly near the fimbriated end. The uterine end of the tube is much twisted. The fimbriated end is nearly occluded by purse-string contraction. (Cullingworth.)

bacteriacidal examination. Howard Kelly notices the relationship between pregnancy and the occurrence of tubercle. Twenty-eight per cent. of his cases date the origin of the affection from a miscarriage or labour.

It is well exemplified in a case of Cullingworth's, in which abdominal section was carried out for pelvic peritonitis, the patient at the time suffering from tubercle of the apex of the right lung.

'The peritoneal surface of the uterus, Fallopian tubes, and adjacent coils of intestine were studded with miliary tubercles. The uterus was pushed forwards by a mass behind it, consisting of a small cystic ovary with the enlarged and thickened right tube curving round it, the whole so densely adherent that nearly an hour was occupied in the separation. The left tube was exceedingly tortuous, much thickened, and universally adherent, the adhesions being more recent than those on the right side. The left ovary

contained a large cyst, but was not enlarged. It was entirely surrounded by adhesions, and its external covering was thickened and opaque.

'On examining the parts removed, the portion of right tube was 3 inches long and 1⅛ broad. The walls were like cartilage, and measured ⅛ to ¼ of an inch in thickness. The mucous membrane was much swollen. The free end of the tube was buried amongst the adhesions. The portion of this left tube measured, while still unstretched, 2½ inches. It was twisted at its uterine end like a corkscrew. At the centre there was a dilated portion ¾ of an inch

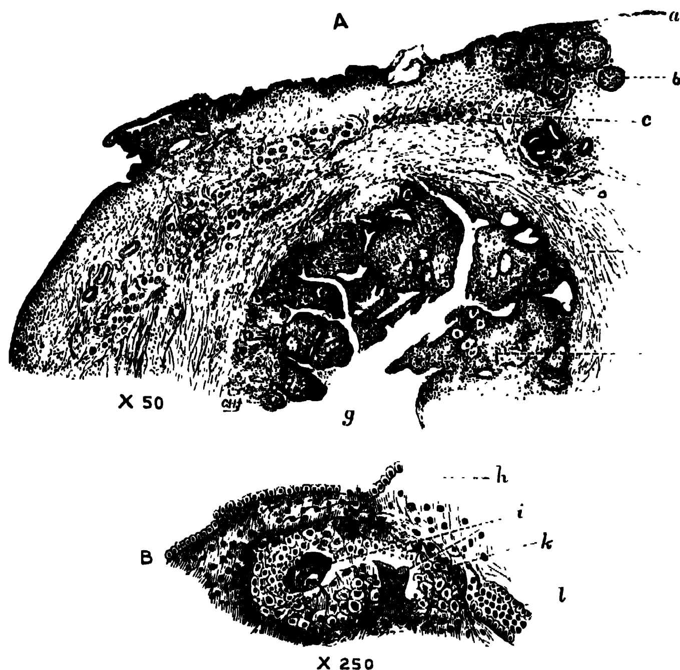


FIG. 484.—TUBERCULAR SALPINGITIS. A, transverse section of tube under a power of × 50; and B, section through a tubercular nodule under a power of × 250, showing two giant cells. *a*, peritoneum; *b*, tubercular nodules in subperitoneal tissue; *c*, longitudinal muscular coat of Fallopian tube; *d*, bloodvessels; *e*, circular muscular coat; *f*, hypertrophied mucous membrane, showing numerous tubercular nodules containing giant cells—the lining epithelium still remains in places; *g*, lumen of tube; *h*, remains of ciliated epithelium; *i*, giant cells; *k*, epithelioid cells; *l*, space lined with columnar epithelium. (Cullingworth, drawing by Mr. C. H. James.)

long, softer than the rest of the tube. The mucous membrane was deeply ulcerated, showing deep pits full of caseating tubercle.'

Charles Noble and Howard Kelly insist on the frequency of tuberculosis of the genitalia and peritoneum. Noble says: 'Three per cent. of the cases operated upon by me during two years were tubercular. Some cases of

tubercular trouble may have been overlooked. If further investigation demonstrate that Kelly's statement is true, as a matter of general experience, that 20 per cent. of such cases are tubercular in their nature, this factor will assume an unexpected importance as a cause of pelvic disease in women.'

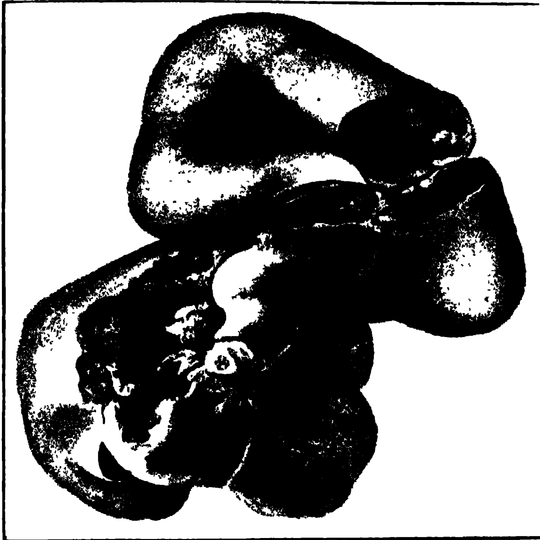
Alban Doran has drawn attention to the frequency with which the ovaries and tubes are affected with tubercle in young persons in whom there is an hereditary predisposition to its development.

There can now no longer be any doubt that unsuspected primary tubercle of the appendages has been occasionally the cause of the obstinate and prolonged presence of uterine and vaginal discharges and other attendant symptoms which, occurring in virgins, and recently married women with no previous history of any generative affection, were difficult to explain. The presence of a persistent leucorrhœa, pains in the iliac regions, difficulty of locomotion, tendency to cervical erosions, erratic menstruation, slightly enlarged and sensitive ovaries, should prompt to suspicion of tubercle as a possible cause. Such symptoms continuing for any time should lead to inquiry into the family history of the patient. Should that confirm the suspicion, then the case ought to be carefully watched, and discharges should be microscopically examined. If tubercle bacilli be discovered, the question of *immediate* salpingo-oöphorectomy or hystero-salpingo-oöphorectomy has to be considered.

Hæmato-Salpinx with Primary Tuberculosis of Fallopian Tube—(*Author*).

The macroscopical and microscopical specimens (Plate XVII.) were prepared for me by J. H. Targett, who has furnished me with the pathological report. The lady from whom the adnexa were removed first consulted me early in May of 1899. She then complained of pain in the right side, pain after passing water and attendant irritation of the bladder. Previous treatment had been fruitless. She was twenty-nine years of age; in other respects she had very good health, and was of a healthful appearance. The constant pain interfered with her happiness, and kept her more or less an invalid. Her catamenia were regular. The uterus, on examination, was found to be small; there was a tumour of the right adnexa, the left were normal. At the time palliative treatment was resolved upon, and she returned home. In June, being no better, and the pain still continuing, as also the bladder symptoms, she came to London, and I performed salpingo-oöphorectomy. She made an excellent recovery, and the bladder symptoms disappeared.

PLATE XVII.



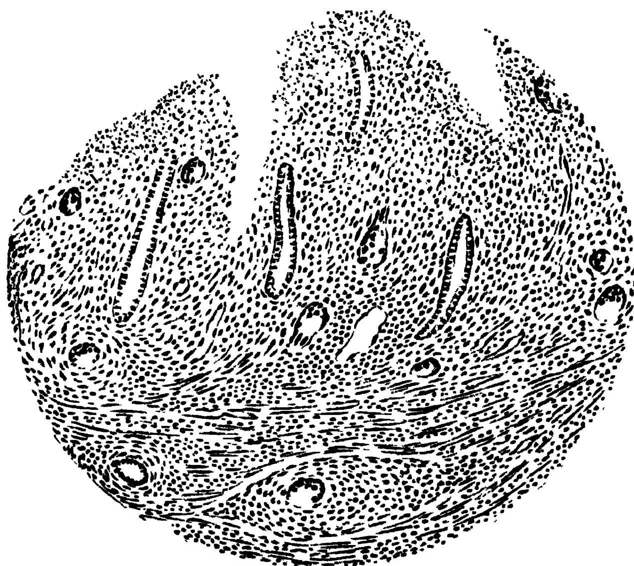
Adnexa, showing Section of the Dilated Tube and the Contained Blood Coagulum; also the Adherent Fimbria. Tuberculosis of the Fallopian Tube (seen from above and in front). (Author.)



Same Specimen, showing the Ovary cut open and the recent Corpus Luteum. Tuberculosis of the Fallopian Tube (seen from behind). (Author.)

To face p. 622.

PLATE XVIII.



PRIMARY TUBERCULOSIS OF FALLOPIAN TUBE. × 100. (Author.)

PLATE XIX.



ACUTE TUBERCULOSIS OF FALLOPIAN TUBE. × 50. From a case operated upon in Landau's Klinik. (J. Stevenson.)

[*To face p.* 623.

Report on Tuberculous Fallopian Tube. (See Plate XVIII.)

'The outer half of the tube is considerably enlarged, and its lumen uniformly dilated. The abdominal ostium is closed by adhesions, but traces of the fimbriæ can be discerned on the exterior. The surface of the tube is generally free from adhesions, though there are a few fibrous threads on the ovary. A section across the dilated portion of the tube shows a marked thickening and rugosity of the mucous coat, as well as a finely granular appearance of the mucous surface. The lumen is filled with blood and retained secretion. Microscopical examination reveals an abundance of grey tubercles in the substance of the mucous membrane, the giant cell systems being well developed. The muscular coat is not yet invaded, though the tuberculous formation has advanced in that direction. The epithelial covering of the thickened rugæ is for the most part preserved. The adjacent ovary presents a recent corpus luteum, and its substance is healthy. There is a striking absence of any peritoneal lesion, and for this reason it is probable that the tuberculosis of the Fallopian tube is primary.'



Fig. 485.—Salpingocele. (After Segars.)

Salpingocele.

Hernia of the Fallopian tube may occur into the inguinal canal with or without its associated ovary, though the latter condition is extremely rare. The case of Bilton Pollard* is an example of hernia of both ovary and portion of the Fallopian tube, the former being strangulated. The symptoms of strangulation of the tube or ovary are much akin to those attending ordinary strangulation of the bowel. The treatment consists in an operation similar to that for hernia — removal of the strangled ovary or tube, the return of the pedicle, and excision of the sac.

* *Lancet*, 1889, vol. ii., p. 165.

CHAPTER XXXI.

TUBAL PREGNANCY.

TUBAL pregnancy means the attachment and development of a fertilized ovum or oosperm within the Fallopian tube, instead of within the uterine cavity. The ovum is able to obtain nourishment sufficient at least for its early growth; but the tube will not bear distension beyond a certain point, and is consequently not adapted for the harbouring of the ovum till full term. Hence, every gravid tube is exposed to a series of one or more accidents, which place the mother's life in jeopardy, and which impart to the subject its immense clinical importance. These accidents we have to consider in detail.

Ætiology.—The cause of tubal pregnancy is unknown; even on the subject of predisposing causes authorities are divided. The first point to settle is whether impregnation occurs normally in the Fallopian tube, as well as in the uterus; or whether impregnation in the tubes is abnormal. Some authors hold the latter view, and believe that, if impregnation occur in the tube, it leads to ectopic gestation. Others, on the contrary, hold, with Taylor, that there is no evidence whatever that the seat of normal impregnation is limited to the cavity of the uterus; while the facts that are known concerning the invasion of the tubes by spermatozoa point to the conclusion that normal fructification of the ovum may occur at any stage of its passage from the ovary to the uterus. Thus, according to the former view, tubal pregnancy is due to impregnation in an abnormal situation; according to the latter, it is due to an abnormal settling of a normally impregnated ovum.

What, then, causes this abnormal settling of the ovum? Lawson Tait held that it was due to a previous desquamative salpingitis, and that in most cases of tubal gestation there was a history of inflammatory disease of the adnexa. Sutton holds that a healthy Fallopian tube is more likely to become gravid than one that has

been inflamed. Mandl and Schmit found recently that of seventy-seven cases operated on in Schauta's clinic, twenty-seven occurred in women who had had gonorrhœa; and Shober has reported a case of tubal gestation associated with primary tuberculosis of the tube. Taylor has noted the frequency of an atrophic condition of the tube in these cases, and considers that any want of development in the tube, any permanent contraction, swelling of the mucous membrane, abnormal length of the tube, extra weight or impaired mobility of the ovum at its entrance into the tube, failure of muscular power, or interference with the peristaltic action of the tube, may increase the tendency towards a tubal instead of a uterine 'settling of the ovum.' An ectopic gestation is very apt to occur in women who have been sterile many years; it has been suggested that this may be due to the use of artificial means to prevent impregnation; but this is doubtful. It is evident that, until fresh facts come to hand, we cannot hope to elucidate the cause of ectopic gestation.

Classification.—According to the point of arrest of the oosperm, four varieties of ectopic gestation can be distinguished:—

1. Ovarian.
2. Abdominal.
3. Tubal.
4. Tubo-uterine.

Ovarian Pregnancy.—Such cases have been reported, some of which have been undoubtedly instances of intra-ligamentary position of the ovum, or of encapsulated hæmatocele round the ovum, in both of which the ovary may form part of the outer wall of the gestation-sac. 'Later on, the ovary becomes stretched and thin, owing to inside pressure from the growing pregnancy, and sections of the sac and outer wall discovering the presence of ovarian tissue may wrongly lead to the conclusion that the pregnancy is ovarian. The conditions described need careful elimination before any pregnancy can be held to be strictly ovarian in origin' (Taylor). A case reported at the International Congress of Gynæcology in Amsterdam (1899) by van Tusschenbroek, appears to have been an authentic instance of ovarian pregnancy.

'On opening the abdomen, a great quantity of dark blood gushed forth. The uterus was soft and somewhat enlarged. The left ovary and tube were normal; at the right ovary was found a tumour as large as a walnut, to which blood-clots adhered. The right ovary and tube were removed. The tube was quite normal; the fimbriæ were somewhat conglutinated, but the lumen was free. There were no adhesions between ovary and tube. The

tumour and the ovary showed near its top the place of rupture, from which a ruddy fringe came forth. After being hardened, the specimen was opened by a median section going through the fringed opening. By this section the gestation-sac in the tumour was cut in two halves, and an embryo appeared of about 12 mms. in length, fixed by a short and thick umbilical cord. Microscopical investigation showed that the impregnated ovum had developed within a Graäfian follicle. This was proved by the fact that the wall of material tissue which surrounded the ovum showed the structure of the ruptured Graäfian follicle—the well-known corpus-luteum. Decidual transformation of the connective tissue in the ovisac was nowhere to be found.'

Abdominal Pregnancy.—It is now universally admitted that all the cases of primary abdominal pregnancy that have been recorded belong properly to the category to be presently described as Tubo-abdominal; *i.e.* a primarily tubal gestation-sac has ruptured, and allowed the fœtus to go on growing in the abdominal cavity. Arrest in the abdominal cavity between the ovary and tube is probably always immediately fatal to the unprotected ovum.

Tubo-uterine Pregnancy.—This we shall consider among the varieties of tubal pregnancy, because it may be regarded as arrest within the uterine portion of the tube.

Tubal Pregnancy.—The Fallopian tube is not adapted to carry a developing ovum till full term. It either ruptures, or ejects the ovum through the open fimbriated extremity as a 'tubal abortion.' In the event of rupture, the ovum may continue to grow; according to the direction in which rupture takes place, three later developments of tubal pregnancy may be distinguished: (*a*) Tubo-abdominal, in which there is secondary invasion of the abdomen; (*b*) Tubo-ligamentary, in which there is secondary invasion of the broad ligament and sub-peritoneal tissues; (*c*) Tubo-uterine, in which there is secondary invasion of the uterus. Each of these forms may present one or more further developments; and the following table shows at a glance the natural history of tubal pregnancy, when left to itself:—

I. Early rupture (before sixth or eighth week). Sudden and rapidly fatal hæmorrhage unless operated upon.

II. Tubal abortion (usually before eighth week). Formation of a tubal mole and hæmorrhage from the open end of the tube.

1. *Complete tubal abortion.* The mole is expelled from the tube and lies outside it in the midst of the blood-clots.
2. *Incomplete tubal abortion.* The mole is retained in the tube.

III. LATER RUPTURE (usually eighth to twelfth week). In every case the placenta remains directly connected with a part or whole of the tube.

1. *Tubo-abdominal invasion* (abdominal pregnancy). The fœtus always lies above the placenta; the position of which leads to three varieties.
   (*a*) The placenta is in the main gestation-sac, and covered over on both surfaces by reflections of the amnion.
   (*b*) The placenta is fastened to opened-out tube, back of uterus, and adjacent structures.
   (*c*) The placenta remains wholly in the tube, through a rent in which the cord passes to the fœtus, which is lying invested by amnion in the abdominal cavity.
2. *Tubo-ligamentary invasion* (mesometric pregnancy). The placenta always lies primarily above the fœtus; the direction of growth of the ovum leads to two varieties.
   (*a*) Anterior, or sub-peritoneo-abdominal, in which the peritoneum is stripped up anteriorly.
   (*b*) Posterior, or retro-peritoneal, in which the peritoneum is stripped up posteriorly.
   In either case the broad ligament sac may again rupture, leading to—
3. *Tubo-ligamentary-abdominal invasion.* Here the placenta remains in the broad ligament sac, through a rent in which the cord, invested by amnion in the peritoneal cavity, passes to the fœtus.
4. *Tubo-uterine invasion* (interstitial pregnancy). Rupture usually occurs before the sixteenth week, into—
   (*a*) The abdominal cavity: a very fatal accident.
   (*b*) The uterine cavity. It is possible that this may go on to term, simulating normal intra-uterine pregnancy.

It must be remembered that, whenever rupture occurs, either early or late, as indicated in the above table, the embryo may either perish at once, or go on developing, according to the amount of interference with the placenta involved in the accident. We are, of course, speaking of cases where no surgical interference is resorted to. When the fœtus dies at an early stage of pregnancy, it generally undergoes a process of absorption, and completely disappears; but

when it has attained a greater development, it becomes dried up and mummified, or is changed into adipocere. Such a fœtus may remain many years in a woman's abdomen, and give rise to no symptoms. In other cases, after the lapse of a longer or shorter time, the sac containing the fœtus may undergo suppuration, and result in an abscess which discharges through the bladder, rectum, vagina, or externally; the contents of such an abscess consist largely of fœtal bones. Thus, in a case recorded by Currier, in which abdominal section was undertaken fourteen years after the occurrence of ectopic gestation, on account of septic development, a quantity of offensive fluid was found in the abdomen, and fœtal bones, a hundred and twenty-six in number, were removed. In several recorded cases, as in one of Mayo Robson's, the fœtus had been converted into a lithopædion.

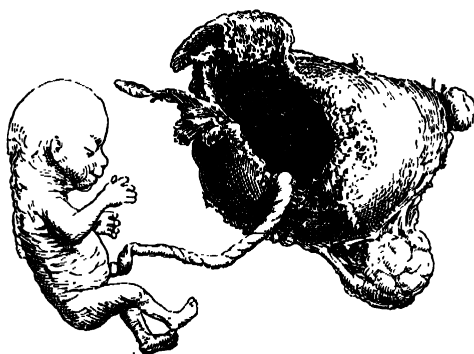


FIG. 486.—EXTRA-UTERINE PREGNANCY. FŒTUS, SAC, AND OVARY. RUPTURE OF AMPULLA. (Operation by Dr. Peck, of Youngstown, U.S.) Recovery. Half natural size. (Howard Kelly.)

Pathology. — The tube in which an oosperm has become arrested undergoes certain changes; its vascularity greatly increases, and its walls become thickened. According to Clarence Webster, a true decidua forms, as in the case of uterine pregnancy. Bland-Sutton and others deny that there is any decidua formed. In any case, as Taylor points out, a special zone of mucous membrane differentiates into a potential decidua serotina, and within this zone the chorionic villi develop. It is a remarkable fact that in tubal gestation a decidua is always formed within the uterus. The hyperæmia of the tube and broad ligament is mainly due to the enlargement of the ovarian artery; by firm pressure in the vaginal fornix under a gravid tube, the hyperæmia can be detected by a markedly increased pulsation.

Within the first six or eight weeks the abdominal ostium of the tube almost always becomes closed; the exceptions to this rule are found, firstly, in cases in which the ovum is anchored at the uterine extremity of the tube; and secondly, in cases where the closure is

anticipated by early rupture or by tubal abortion. It is important to remember that a tube may rupture even though its abdominal ostium remain patent, from pressure exerted at right angles to the tubal axis.

A tubal embryo is peculiarly liable to perish from hæmorrhage taking place between the chorion and the amnion, whereby the ovum is converted into a 'mole.' A tubal mole is an ovoid mass averaging 5 cms. in its long, and 3 cms. in its short diameter. On cutting a mole open, the amniotic cavity can be usually recognized, situated excentrically in the midst of the blood-clot; and within the amniotic cavity the embryo may be found (Fig. 488). Microscopically, the mole is recognized as such by the presence of chorionic villi embedded in blood-clot. The accident that leads to the formation of the mole has one of two effects: *tubal abortion*, in which the mole is partly or wholly detached from the tube, and hæmorrhage occurs into the abdominal cavity, through the open fimbriated extremity of the tube; or *tubal rupture*, in which hæmorrhage takes place into the broad ligament or peritoneal cavity, according to the position of the rupture. In either case the accident is marked by the onset of uterine hæmorrhage, of which a characteristic feature is the presence amid the clots of fragments of the decidua from the uterus. Sometimes the decidua is expelled whole, or in two or three main pieces, forming a more or less complete cast of the uterine cavity (Fig. 489); it is then a very characteristic object, consisting of a fibrous non-vascular membrane, triangular in shape, with orifices at the angles corresponding to the apertures of the uterine ostia of the tubes and the internal os respectively, and with a shaggy exterior. Similar casts are found in membranous dysmenorrhœa, the main difference being that the latter are smaller, and are passed at recurrent intervals coinciding with the menstrual periods.



FIG. 487.—LITHOPÆDION REMOVED FROM THE ABDOMINAL CAVITY FOUR YEARS AFTER A FALSE LABOUR. Placental attachment to right tube. Peculiar membrane covering features and part of body with a deposit of calcareous salts in it and the skin. Other portions of the skin leathery and converted into adipocere. (Howard Kelly.)

Symptoms and Signs of Tubal Pregnancy.—Up to the time of the sixth or eighth week, there is little to distinguish a tubal from a uterine pregnancy, beyond the fact that there may be a little

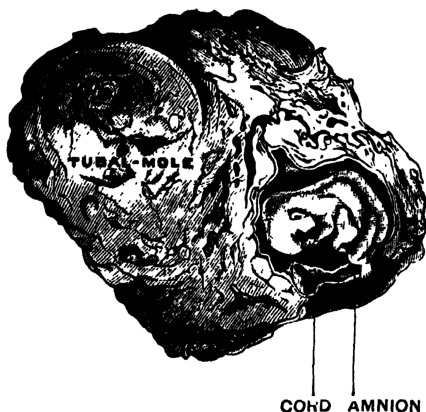


FIG. 488.—A TUBAL MOLE. Natural size. (After Walter.)

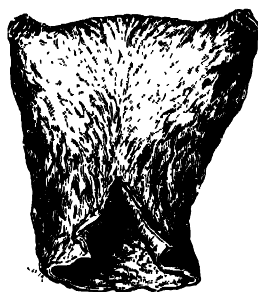


FIG. 489. —A UTERINE DECIDUA EXPELLED IN A CASE OF TUBAL PREGNANCY. (After Bland-Sutton.)

aching in one side; if an examination be made, the uterus will be found rather smaller than it should be for the term of pregnancy, and one tube may be made out to be enlarged. A gravid

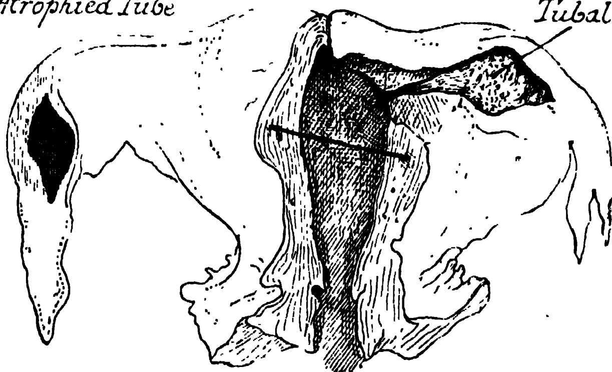


FIG. 490.—TUBAL PREGNANCY IN CASE IN WHICH THE FALLOPIAN TUBES WERE ATROPHIED, WITH ACCIDENTAL RENT IN THE NON-IMPREGNATED TUBE. Specimen, Mason College Museum. (Taylor.)

tube is, however, rarely discovered before rupture. When rupture occurs, and the pregnancy is uninterrupted, there may be a total

absence of symptoms pointing to an abnormal gestation, and the patient may go on to term, expecting an ordinary confinement.

Symptoms and signs must now be considered as met with in the following circumstances:—

Early tubal rupture.
Tubal abortion.
Later tubal rupture.
Tubo-abdominal pregnancy.
Tubo-ligamentary pregnancy.
Tubo-uterine pregnancy.

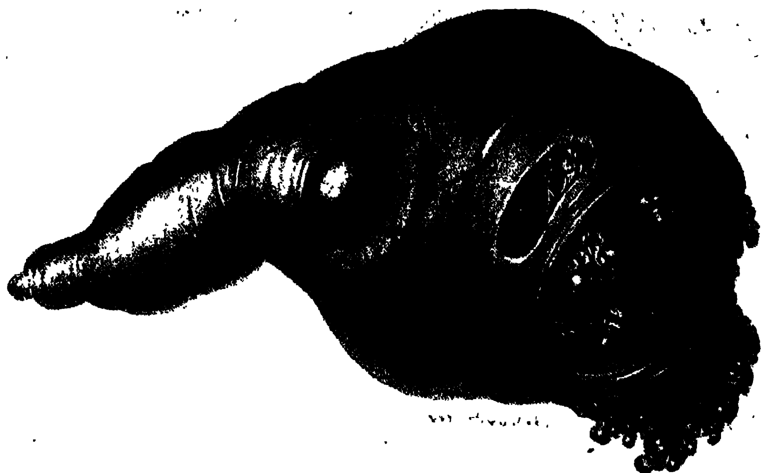


Fig. 491.—Tubal Abortion, showing the Distended Cavity, the Greater Diameter of the Clot in the Ampulla preventing its Escape. Operation. Recovery. Natural size. (Howard Kelly.)

Early Tubal Rupture.—The history of this rare occurrence is that a woman in good health, whose monthly period is about a week overdue, is overtaken by a sudden and alarming collapse, quickly followed by all the signs of profuse internal hæmorrhage. If surgical aid be not forthcoming, the patient dies after an illness of eight to forty-eight hours' duration. On vaginal examination, there may be nothing felt except a vague boggy fulness in the pouch of Douglas; but if the bleeding has been going on for some time, there will probably be dulness on percussion above the pubes and in the flank. According to Taylor, the tubes in these cases are

nearly always ill-developed and small, with the muscular coat defective and the uterine ostium small.

Tubal Abortion.—This, as explained, means the outpouring of blood through the abdominal ostium, together with the formation of a mole. The latter may be retained within the tube (Fig. 490), or expelled with the blood into the peritoneal cavity (Fig. 492); and the tubal abortion is accordingly ascribed as complete or incomplete. Complete tubal abortion is accompanied by hæmorrhage, which is usually severe, but is not repeated, and may not be fatal; but with incomplete abortion the tendency to bleeding continues as long as the mole is retained, just as a retained placenta leads to continued uterine hæmorrhage. The blood may be poured out abundantly, or it may assume the character of a 'blood-drip,' as Taylor calls it. The effused blood is called a pelvic hæmatocele; this term was formerly used to describe a definite pathological condition, whose origin was not known. Now it is almost universally regarded as due in every case to tubal pregnancy, and, as descriptive of a separate condition, the term may be regarded as obsolete. Hæmatoceles vary in character: when due to tubal abortion, the blood is generally circumscribed so as to form a definite tumour; on the other hand, if caused by tubal rupture, the limiting membrane may be slender and ill-defined, and liable to sudden and marked alterations from fresh bleeding: or the escape of blood may not be circumscribed, but 'diffuse,' when it is checked only by operation or death. It does not then come properly under the category of a hæmatocele. From this description, the nature of the symptoms of a tubal abortion may be inferred. The patient is first seized with a sudden faintness, accompanied, as a rule, by sharp pain; this, if the bleeding be free, merges into a deepening collapse.



FIG. 492.—ECTOPIC GESTATION, SHOWING THE DILATED AND THICKENED TUBE WITH THE ADHESIONS TO THE OVARY. In this case a perfect tube cast was thrown off into the abdominal cavity. Operation. Recovery. Three-fourths natural size. (Howard Kelly.)

When the latter takes the form of a blood-drip, the patient may partially recover, although liable to recurring attacks of collapse when the retained mole leads to repeated outpourings of blood. Sometimes each attack is accompanied by sharp pain, due to 'tubal colic;' and in some of these cases it is found, on opening the abdomen, that the tube has repeatedly filled with blood which has become converted into a clot forming a cast of the tube; and that each cast has been expelled with a fresh accession of pain and bleeding. On vaginal examination of a case of tubal abortion, a boggy tumour is found occupying the pouch of Douglas; and on one or other side a swelling is felt in the situation of the tube. The lateral swelling is more marked in cases of incomplete tubal abortion.



FIG. 493.—HÆMATOCELE CAPSULE SEEN FROM WITHIN, WITH THE FIMBRIATED END OF THE TUBE IN POSITION. (Taylor.)

The diagnosis is completed by the history of the case, which elicits the fact that the patient had missed one or two menstrual periods, and thought herself pregnant; she may state that a relatively long period of sterility has elapsed since her last pregnancy, or that she has not been previously pregnant.

Later Tubal Rupture.—This, like tubal abortion, generally occurs between the eighth and twelfth weeks of pregnancy—unlike the early rupture, which generally takes place into the peritoneal cavity (Fig. 491) or into the broad ligament (Fig. 495); and the symptoms will vary accordingly. In the former case, the symptoms are sudden and alarming; in the latter case, they are less marked, and may be followed by complete recovery. The history of the case resembles that described under tubal abortion. The condition found on vaginal examination, when the rupture is intra-peritoneal,

is hardly distinguishable from that found in the case of tubal



FIG. 494.—LEFT ECTOPIC GESTATION. RUPTURE AT JUNCTURE OF THE AMPULLA WITH THE ISTHMUS. Operation. Saline injection and recovery. Natural size. (Howard Kelly.)

abortion, but when the rupture is mesometric, there is no fulness to be discovered in the pouch of Douglas; on the other hand, the lateral swelling is much more marked. A large proportion of the cases formerly described as pelvic hæmatoma belong to this category; it is the only kind of tubal pregnancy that can be safely left without surgical interference, under proper observation; but even these cases may require operation sooner or later. Later rupture of the tube may result at once in the death of the fœtus; or this may continue to develop, if the placental attachments have not been too much interfered with, into one of the forms to be next described.

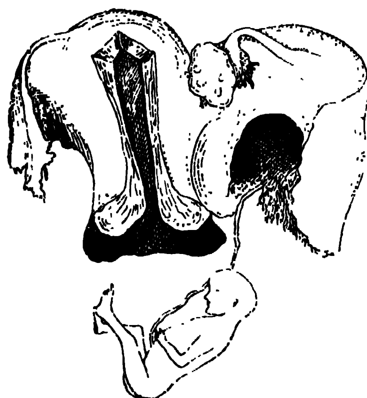


FIG. 495.—BROAD LIGAMENT PREGNANCY. CAVITY IN THE BROAD LIGAMENT. The tube has disappeared; rupture of middle third, which forms the vault of the pregnancy; placenta (Taylor says) would be found in the roof and lateral wall of the chamber. It lay above the fœtus. (Taylor.)

An important symptom of both abortion and rupture of a gravid tube is uterine hæmorrhage, associated with the discharge of larger or smaller portions of decidua, as previously described.

Tubo-abdominal Pregnancy.—We have said that this condition may go on to full term without any suspicion being excited that the fœtus is not within the uterine cavity. At term a spurious labour sets in; the os uteri dilates to some extent, but then, of course, no further progress is made. The medical attendant is then led to explore the interior of the uterus, which is found empty, and of small size. On abdominal palpation, the fœtal limbs may be made out much more distinctly than is consistent with intra-uterine pregnancy. If the true state of things be not detected, the labour pains gradually cease, the fœtus dies, and is converted into adipocere or into a lithopedion (Fig. 487).

In other cases, pregnancy does not proceed so smoothly; the sac may contract pelvic adhesions, and become incarcerated in the pouch of Douglas, simulating retroversion of the gravid uterus. Pelvic inflammation then commonly supervenes, and this, together with the pressure symptoms, will generally lead to surgical interference, and to a discovery of the true state of matters.

Tubo-ligamentary, or Mesometric, Pregnancy.—Mesometric pregnancy cannot proceed beyond the fourth or fifth month without giving rise to serious symptoms and well-marked physical signs, due to pressure of the gestation-sac on the pelvic contents. The symptoms will be those of pelvic inflammation and pressure; on examination, a swelling will be detected in the iliac fossa, and the enlarged and pushed-up uterine fundus will probably be felt in the middle line, or pushed over to the opposite side. On vaginal examination, the broad ligament is found occupied by a small swelling, feeling rather like an inflamed broad ligament cyst. The symptoms of pregnancy—amenorrhœa, morning sickness, and milk in the breasts—may be well marked; and if, in addition, there is a clear history of an attack of syncope or iliac pain, a correct diagnosis is fairly easily arrived at. In the absence of such history and symptoms, however, the diagnosis may be very difficult; indeed, it may not be made until the abdomen is opened.

In other and rarer cases, the increasing pressure within the broad ligament leads to secondary rupture of the gestation-sac; this is specially liable to occur in that variety of mesometric gestation in which the fœtus lies above the placenta, since the restraining membrane, consisting of fœtal envelopes and thinned-out broad

ligament, is much less resistant than when it is composed of placenta. When this accident takes place, the patient is again placed in jeopardy, owing to the risk of fatal hæmorrhage; but if this risk be averted, the fœtus will probably continue to develop, the pregnancy being then of the type of the 'tubo-ligamentary-abdominal' invasion (see Table III. 3, under classification). This pregnancy, like the tubo-abdominal, may go on to full term, and the same sequence of events takes place.

Tubo-uterine, or Interstitial, Pregnancy.—This is a rare form of ectopic gestation in which arrest of the ovum has taken place within the portion of the tube near the uterine ostium. As a rule, rupture occurs early, and it is one of the most rapidly fatal forms, owing to the fact that the rent involves the highly vascular uterine tissue. But here also there is a way of escape if the rent open up the uterine substance instead of passing through the peritoneal coat. The later development of the case is that secondary rupture takes place into the uterine cavity, or into the peritoneum. Very little is known, however, of this subject; and it is probable that some cases at least, described as belonging to this class, have really been instances of pregnancy in the rudimentary horn of a uterus unicornis.

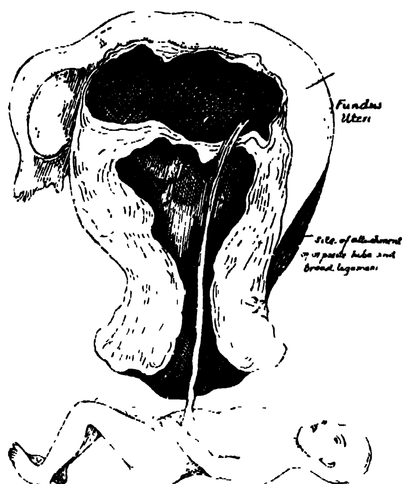


Fig. 496.—Ectopic Gestation, Tubo-uterine or Interstitial Pregnancy; the sac of pregnancy appearing to lie across the fundus from right to left. In reality, as pointed out by Dr. Taylor, the unaltered part of the fundus lies altogether to one side of this sac of pregnancy (Guy's Hospital Museum). (Taylor.)

Repeated Ectopic Gestation.—Many cases of repeated ectopic pregnancy have been reported: for instance, Falk of Gena operated upon a woman who first underwent laparotomy in 1894 for tubal pregnancy in the right tube, and who was operated upon again in 1897 for pregnancy of the left tube, doing well on each occasion.

Diagnosis.—The main points in diagnosis have been indicated

* *Zeitschrift f. Geb. u. Gyn.*, 33, 2.

in the account of symptoms and signs, and may be summarized as follows :—

(*a*) Before rupture or abortion, diagnosis will probably be made by accident, because the only symptom, other than those associated with pregnancy, is pain or aching in one side. If this lead to examination, a swelling will be discovered on one side of the uterus, in the region of the tube; pulsating vessels will be felt in the corresponding vaginal vault; and the uterus will be felt to be smaller than a gravid uterus of the same period. It may be difficult to diagnose the case from one of diseased appendages or a small ovarian or broad ligament cyst.

(*b*) At the time of rupture or abortion, the diagnosis of a typical case is not difficult, if the following points be noted: The patient has probably been sterile for some years, but otherwise in good health; she has missed one or two periods, after which there has been uterine hæmorrhage, dark in colour, moderate in amount, and persistent in its course. With the blood there has been the passage of some membrane, as a complete decidua, in several pieces, or in shreds; the onset of bleeding has been accompanied by sharp one-sided pain and by collapse, and there may have been repeated attacks of this kind, or the collapse has been continuous and progressive. On examination, marked pulsation is felt in one vaginal vault, and on this side there is a tubal tumour which may or may not be associated with a swelling (hæmatocele) in the pouch of Douglas, displacing the uterus forwards or to one side; if explored, the uterus is found empty, and there may be found milk in the breasts, and other symptoms of pregnancy. It is often difficult to diagnose between tubal rupture and tubal abortion. Sudden and profound shock, associated with a swelling in the pouch of Douglas, is indicative of intra-peritoneal rupture; less-marked collapse, especially if recurrent, together with post-uterine swelling, points to tubal abortion; slight shock with a

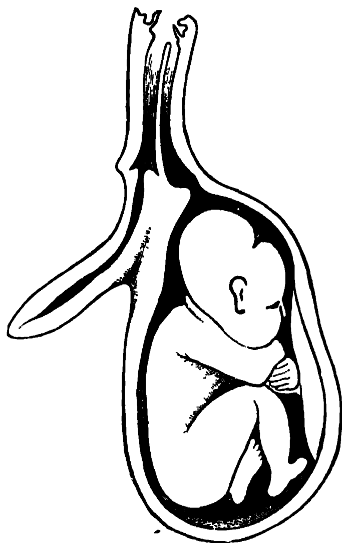


FIG. 497.—DOUBLE UTERUS AND VAGINA. Pregnancy in right uterus. (Taylor.)

marked swelling in the broad ligament is probably extra-peritoneal rupture.

(*c*) Tubal gestation at or about mid-term, after the primary rupture has been got over, will present some of the symptoms, but none of the signs, of uterine pregnancy; and will require to be differentiated from—

1. Myoma.
2. Simple abortion.
3. Pyosalpinx with amenorrhœa.
4. Anteflexion or retroflexion of the gravid uterus.
5. Pelvic cellulitis.
6. Twisted pedicle tumours of the tube or ovary.

The latter will especially be simulated by the complication of ectopic gestation by secondary rupture.

(*d*) Tubal gestation at term is sometimes suspected when the fœtal parts can be felt with abnormal distinctness on abdominal palpation; but the diagnosis is only definitely made when the uterus is explored at the onset of labour and found empty.

When the abdomen is opened, ectopic gestation can be diagnosed with certainty by finding, (*a*) the fœtus, or (*b*) chorionic villi in the tube. The presence of a mole may be regarded as pathognomonic.

Prognosis.—The gravest complications of tubal pregnancy are early rupture, later intra-peritoneal rupture, and tubo-uterine rupture. In the case of rupture into the broad ligament, surgical intervention is not so urgent, and in some cases is not necessary. If pregnancy continue, the patient's life is constantly threatened by the risk of secondary rupture, grave pressure symptoms or septicæmia. These risks persist after the full term of pregnancy has passed. When operation is undertaken, the prognosis is good, except in the case of operation at term with a still active placenta; in the latter, the operation is one of the most formidable in the whole range of surgery.

Treatment.—It may be stated generally that whenever tubal gestation is discovered, operation for the removal of the fœtus and sac should be undertaken at the earliest possible moment. The question, however, has to be considered in some further detail.

At the time of primary rupture or abortion, operation is required in every instance, with the possible exception of cases of rupture into the broad ligament, where it is allowable to wait and watch.

The risk of operation is far less than the continuance of the bleeding, which may not cease until life is extinct. The operation is quite simple, and consists of the evacuation of the blood-clots, and the removal of the affected tube and ovary. The method of operation will vary according as the indication for operation is diffuse hæmorrhage or a localized tumour (Taylor). Operations for hæmorrhage may be required in—

1. Early rupture of the tube.
2. Later rupture of the tube.
3. Secondary rupture of a broad ligament pregnancy or peritubal hæmatocele.
4. Rupture of a tubo-uterine pregnancy.

The operation, being one of emergency, will involve abdominal section. When operating for a localized hæmatocele or for an intact pregnancy, some surgeons advocate vaginal cœliotomy, whilst others prefer abdominal section. In the main, it is a question of individual predilection. For a true retro-uterine hæmatocele, the best plan will generally be incision of the mass through the posterior fornix. For unruptured tubal pregnancy, colpotomy is easy if the vagina be capacious. For mesometric pregnancy, where the fœtus lies below the placenta, the safest operation in some cases will be the delivery of the fœtus through a vaginal incision, the broad ligament being then packed with gauze. Donald reports a case where this was done as late as the seventh month. The abdomen had first been opened, and the placenta found in such a position that its removal was not considered safe.

Figs. 488 and 489 illustrate a most interesting case of ectopic gestation operated upon by Cullingworth. Clinically it attracts attention from the difficulty experienced in diagnosis, as the mass, lying in Douglas' pouch, was first mistaken for retroversion of the uterus, an error that Cullingworth cleared up by the use of the sound. Myo-hysterectomy was performed, and the uterus with the gestation were removed. Pathologically the specimen is remarkable from these points of view. The Fallopian tubes were normal, though the ostia were closed and adhering to the ovaries; the gestation was complicated by the presence of several subserous myomata; the sac was covered for one-fourth of its entire circumference by uterine tissue, and a short distance from it the Fallopian tube was occluded; the *umbilical cord lay entirely within the sac*, and there was no indication of a placenta. The conclusion of Cullingworth

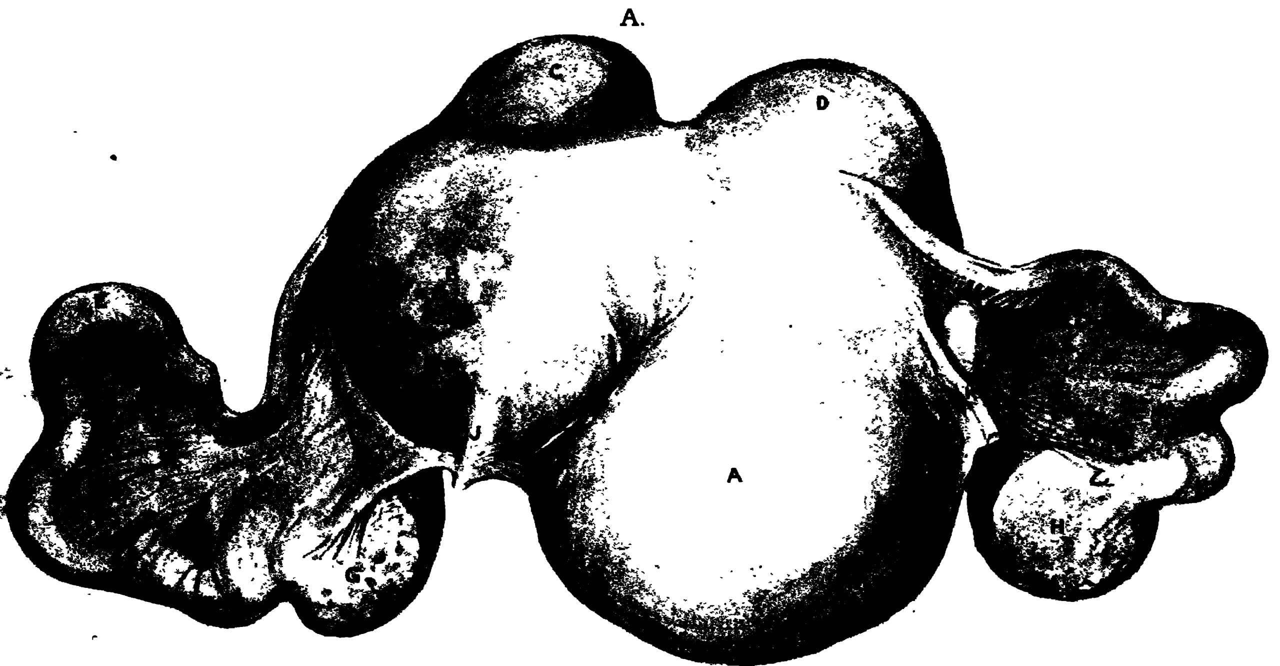


Fig. 498.—Ectopic Gestation with Fibromyomata. View from the front and above. A, interstitial fibromyoma in anterior wall of uterus; B and C, gestation sac filled with blood-clot, forming projections similar in appearance to, but softer in consistence than, those formed by the fibromyomata; D, interstitial fibromyomata in posterior wall of fundus uteri; E, right Fallopian tube (8 inches); F. left Fallopian tube (5 inches); G, right ovary; H, left ovary; J, right round ligament. with point of uterine organ displaced outwards by the gestation sac; K, left round ligament, normal. (Cullingworth.)

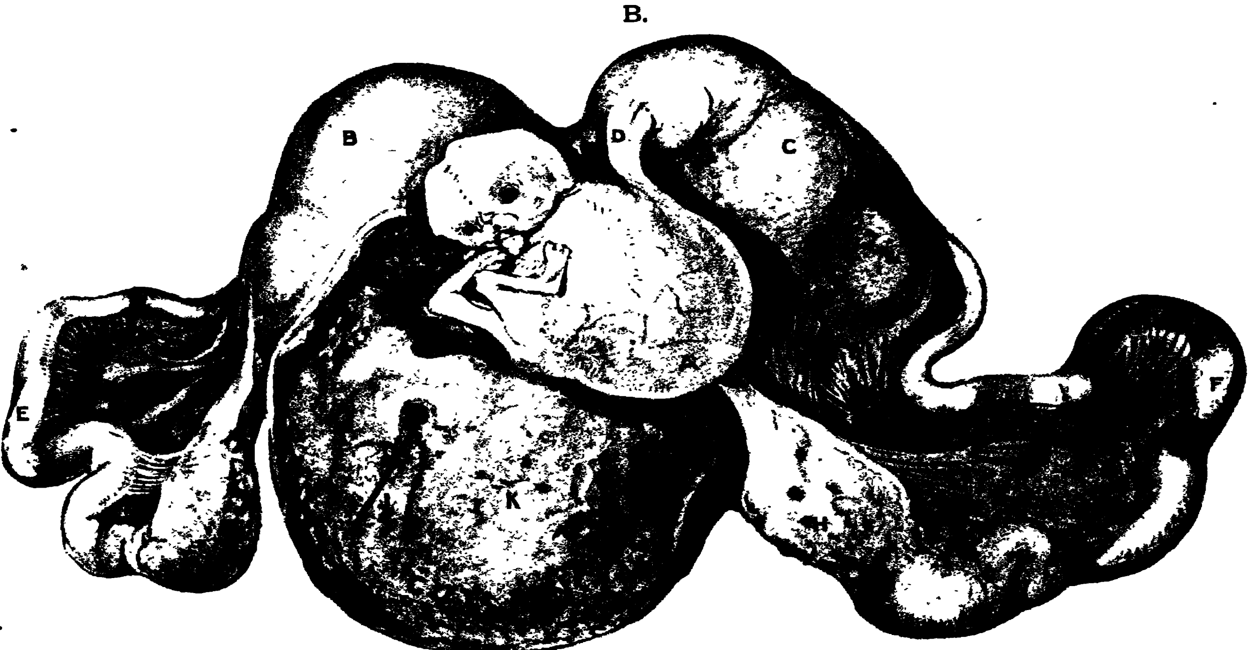


FIG. 499.—ECTOPIC GESTATION WITH FIBROMYOMATA. View from behind and below. A, sac, with head and limbs of fœtus protruding from one end, found lying in Douglas' pouch; B, small interstitial fibromyoma in posterior wall of uterus; C, gestation sac filled with blood-clot; D, band of tissue, with central canal, connecting A with C; E, left Fallopian tube; F, right Fallopian tube; G, left ovary; H, right ovary; J, bristle passed into uterine canal at junction of corpus and cervix; K, cut surface of uterus, showing plane of division at level of isthmus. Uterine body enlarged by fibromyoma in anterior wall. (Cullingworth.)

that the gestation was originally tubo-ovarian, appears to be the most correct.

When an ectopic gestation is first detected at or after mid-term, some authors advise that it be left till term, in order to not sacrifice the child. Others advise waiting still longer, until the child is dead, and the placental circulation has ceased. The second argument, of course, nullifies the first. It is probably better to operate at mid-term, or as soon as the condition is discovered. There is no record, so far as I know, of a tubal child attaining to adult life. Moreover, the earlier the operation is undertaken, the easier it is, and the safer it is for the mother. This last consideration should also be the first.

In operations during the latter half of pregnancy, the question of greatest importance is what to do with the placenta. It was formerly taught that no attempt should be made to separate the placenta when the child is living. But Taylor's valuable recent observations have placed the matter in a different light, and given important practical rules for treatment by the distinction he has drawn between true tubo-abdominal pregnancy, in which the placenta is more or less connected with the Fallopian tube, and the rarer form in which there has been a late rupture of a broad-ligament pregnancy, and where, consequently, the child is abdominal, and the placenta intra-ligamentary. Broadly, when it has a tubal attachment, the placenta should be removed; when it is intra-ligamentary, it should be left. Mayo Robson has recorded a case in which he found it easy to remove a placenta at term; it was a true tubo-abdominal pregnancy. Van Both has recorded a similar case operated on during the eight month; the child survived twenty hours. He says that whether it had developed intra-ligamentarily or not could not be ascertained, but it is probable that it had so developed, because 'after separation of adhesions, the placenta was found to possess a pedicle which was ligatured, and the whole placenta was removed.'

When the placenta is in such a position that it cannot be removed, the margins of the sac should, if possible, be sewn to the peritoneal edges, and the sac itself packed with iodoform gauze. The placenta gradually disintegrates and separates; there is some risk of septicæmia, and convalescence, at the best, is apt to be tedious.

Thorne of Magdeburg, after observation of a hundred and thirty-six cases of tubal pregnancy, a hundred and thirty-two of which occurred in the first

three months, and thirty of which were operated upon by laparotomy, and nine by vaginal incision, arrives at these conclusions: that every case of ectopic pregnancy or its results should be placed as soon as possible under clinical care. Every ectopic ovum should be removed by laparotomy if living, or even though dead, if still in its ovisac, as soon as the second month of pregnancy has elapsed; an ovum of not more than eight weeks' development can be completely resorbed in the tube without subsequent ill effect, but this can only happen under firm clinical control. Threatening symptoms of decomposition or secondary hæmorrhage appear to indicate extirpation; rupture and hæmorrhage into the abdominal cavity call for immediate laparotomy; if the hæmorrhage cease, and if a circumspect examination does not discover any tumour in the uterine region, we should wait. If there be a tumour in the tube, the ovum is not yet expelled, and laparotomy is out of place. Recent hæmatocele is not to be operated on; a rise of temperature in the first week does not point to decomposition; nor should one proceed to operation because of resorption not taking place, until six weeks at least have elapsed.

Bouilly of Paris, from the conduct of fifty cases, maintains that the general surgical rule may be laid down that extra-uterine pregnancy in the course of evolution, or arrested in its evolution, imperiously demands operative interference, and that the operation to be done is salpingectomy—removal of the ruptured tube.

Fehling argues that operation is indicated, if in spite of rest under medical observation the tumour continues to get larger, if there be symptoms of internal hæmorrhage, or suppuration of the sac. He advocates the removal of diseased adnexa by the abdominal method. In the differential diagnosis the following conditions have to be excluded.

Retroflexion of the gravid womb, retro-uterine tumours, softening myomata, and ovarian cysts must be considered in the differential diagnosis as well as other tumours of the tubes, especially *sacto-salpinx purulenta*, which he himself mistook four times for tubal abortion. Hæmatocele from pelvic peritonitis may complicate the case and increase the difficulty of diagnosis.

*Some Special Observations on the Operative Treatment of Ectopic Gestation.**

Cœliotomy is the operation to be performed in the large proportion of cases. The diagnosis having been determined, and operation decided upon, it is well, in certain cases, when there is collapse or considerable anæmia, to resort to the injection of artificial serum, either immediately before or, possibly better, an hour previous to, operation. In preparing the abdomen or the vagina aseptically, untoward pressure must be avoided, lest further hæmorrhage be induced. The patient is placed in a moderate Trendelenburg

* For all the usual steps of cœliotomy, abdominal and vaginal, see chapters on the operative treatment of fibromyomata.

position, the abdominal cavity is opened as rapidly as possible, and the extravasated blood is removed by the hand, followed by careful and not too rough sponging. This, however, may not be possible from the active bleeding, and then the uterus is quickly sought for, and the broad ligament at either side is felt, and a search is made for the gestation. This, when found, is seized and withdrawn from the abdomen, while the parts below the tube are secured by a clamp forceps, two of these being used if necessary, so as to prevent any further loss of blood, either before or during the removal of the

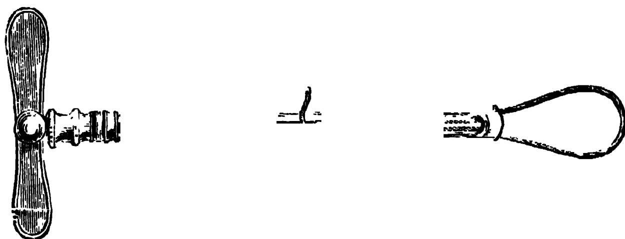


FIG. 500.—KŒBERLÉ'S SERRE-NŒUD

ovum. This is affected as in ovariotomy by transfixation of the broad ligament below the tube, which is tied off in the usual manner. It is well to keep the clamps on until after the fœtus is removed, and then to loosen these to ascertain if the hæmorrhage has ceased ; and despite the application of ligatures, should the bleeding persist, it is better to resort to forci-pressure for twenty-four hours : should the clamps also fail to arrest the bleeding, a Mikulicz plug of iodoform gauze must be carried deeply into the pelvis.

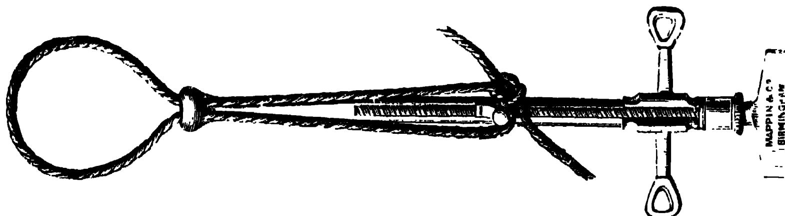


FIG. 501.—TAIT'S TEMPORARY ROPE TOURNIQUET.

Taylor, in cases of tubo-uterine or interstitial rupture with diffuse bleeding, recommends that the uterus should be drawn out of the wound and two transfixion pins passed first through the peritoneum on one side of the incisions, then through the uterus well below the tear, and finally through the peritoneum of the opposite side, and his wire clamp applied below these and screwed thoroughly taut. In all these cases it is well to have a serre-nœud to hand, or the rope tourniquet of Tait.

The abdomen is then carefully washed out through the upper part of the incision, and a drain may be inserted above the clamp. After final tightening of the clamp the parts above it are cut off, the stump being surrounded with iodoform gauze. Care is taken that no slipping of the broad ligament shall occur before the wire is finally tightened. He lays special stress on the thorough washing out of the abdomen with a syphon tube.

Operation of Colpotomy.

The method of opening through the vagina may be either through the vesico-uterine fold of peritoneum, or the posterior cul-de-sac and the recto-uterine fold. Anterior colpotomy has its special advocates, and is the operation generally performed by A. Martin. The posterior is chosen by such operators as Doyen in France, Howard Kelly in America, and Taylor in England. Before either operation is performed, a careful examination is made under anæsthesia, so that the relations of the sac to the peri-uterine structures may be as far as possible defined. The operations of anterior colpotomy have already been described (see Salpingo-Oöphorectomy). Taylor's objections * to it are mainly as follows: (*a*) Insufficient space to work and to remove the products of pregnancy, as well as to wash out the abdomen satisfactorily; (*b*) The difficulty of bringing down the uterus in its enlarged and softened state, and (*c*) the difficulty of carrying out drainage.

The operation of posterior colpotomy has also been described (see Salpingo-Oöphorectomy). When performed for ectopic gestation, the first important difference experienced is the escape of blood and serum in varying quantity from Douglas' pouch. The fingers of the right hand carried inside the peritoneum feel the tumour, and this can be palpated bi-manually by the other hand placed on the abdomen. On depressing the mass thus, it is brought within reach, and the sac of the gestation is felt. Into this, when it is ruptured, the finger is carried, and the ovum, or mole, is detached. This may be assisted by aid of the ovum forceps or blunt spoon. When this is effected, the pelvic cavity is douched out with hot water, and thoroughly cleansed. Should hæmorrhage still continue, the source of the bleeding must be sought for by aid of retractors, and the vessels secured by ligature or forcipressure. Otherwise the adnexa may be separated, drawn down, and removed.

A fairly large tampon of iodoform gauze is carried into the pelvic

* 'Extra-Uterine Pregnancy,' by John W. Taylor, 1899.

cavity, where it is lightly packed, the other end remaining in the vagina.

Taylor * regards this operation as one of election for cases in which the tumour lies posterior to the uterus in a capacious vagina. 'It should never be resorted to for diffuse hæmorrhage unless every convenience of light and operation-table be in readiness.' All violence must be avoided, no portion of the gauze drain should be visible at the vaginal entrance, and it is not removed until the fourth or fifth morning after operation. Taylor also remarks that it is 'quite possible to get severe, even fatal, hæmorrhage from the incision itself, and the farther away this is from the cervix, the greater appears to be the danger.' In using the douche after the first emptying of the gestation sheath, he continues to wash out all the remains of the pregnancy until the stream returns quite clear, and no trace of any retained product can be felt.

Case I. Large Ovarian Blood-cyst, simulating Ectopic Gestation, with Extensive Adhesions to Omentum and Bowel, Twisted Pedicle and Sanguineous Contents. Removal and Recovery. (Author.)

History.—'Mrs. S. First noticed that there was a swelling on one side of the abdomen at Christmas, 1895, but attached no importance to it. Has had three children, aged at the time of operation, 11 years, 6½ years, and 3 years 10 months, and one miscarriage, between the first and second months of pregnancy in March, 1895. The last period came on three weeks before the operation, and was normal in colour and quantity. The periods previous to this had been normal, ever since the miscarriage in March, 1895.

'On February 22, 1896, she was suddenly (with no previous warning, and without making any exertion) seized with acute pain, radiating all over the abdomen, but which later on was more localized in the right lumbar and iliac regions. She became pale, with white lips, faint, sighing, and the pulse was scarcely perceptible.

'When she recovered from this condition the pain was severe. The temperature rose to 104°, and she had indications of peritonitis. Her condition remained critical for three weeks, chiefly on account of her very feeble heart action. The pulse was weak, from 120 to 130. As the abdomen became less distended and painful, a mass could be detected occupying the right side. This gave the sensation of possessing fluid contents.'

When the patient saw me in April, 1896, I found a swelling, occupying principally the right side of the abdomen, and extending as high as the right lumbar region. This evidently contained fluid. On vaginal examination a swelling was detected in Douglas' pouch, the uterus was enlarged, the cavity

* *Lib. cit.*

measuring some three inches, the fundus being felt well above the pubes. The cervix was soft, and the os patulous, admitting the point of the index finger. The breasts were enlarged and sensitive, the nipples turgid, and there were dark areolæ studded with prominent follicles. The diagnosis lay between a possible tubal fœtation with ruptured sac, or an ovarian cyst. The condition of the uterus and the state of the breasts, added to the suddenness of the symptoms referred to on February 22, made me suspicious of the former, while the regularity of the catamenia, added to the fact that the symptoms might also be due to hæmorrhage into an ovarian cyst, pointed to the latter. She had a history of a previous affection of the kidneys, and the presence on and off of albuminuria. Operation was determined upon, and carried out in April. The tumour proved to be an ovarian cyst, reaching from the broad ligament to the right hypochondrium. The omentum was closely adherent to its upper third, and the small intestine was also attached to its anterior surface by adhesions, as low as its pedicle. There were soft adhesions fixing the tumour posteriorly. The omentum and bowel were carefully detached. *The pedicle was found rotated through three revolutions on its axis.* The cyst was full of blood, partly fluid, partly coagulated. The pedicle was untwisted and secured, and the cyst removed, as was also that portion of the omentum which had been adherent, and which was somewhat injured in its detachment. The patient made an uninterrupted recovery from the operation. About three weeks subsequently there were some symptoms of cystitis, but these rapidly subsided. The twisted pedicle, the adherent omentum and bowel, and the sanguineous contents of the cyst, accounted for the symptoms present on February 22.

Case VII.—Case of Ectopic Gestation. Large Sac full of blood, reaching above the Umbilicus. Operation and Recovery. (Author.)

Patient aged 38. There had been four pregnancies, and one miscarriage two years previously. Youngest child, aged 15 months. The catamenia were regular after the birth of this child. The patient had menstruated during previous pregnancies for several months. During the last pregnancy the catamenia continued for five months. A menstrual period commenced on April 5, the regular time, but did not terminate as usual, and there was a constant show for two weeks, during which period she complained of violent pain in the left iliac region, with constant nausea and attacks of faintness, and with pain in defæcation.

On May 6 she was admitted into the Stanmore Cottage Hospital, complaining of pain, especially over the left side. There was a swelling in the left inguinal and hypogastric regions, and still more hæmorrhagic discharge from the uterus, the bowels moving with difficulty. I saw her in consultation with Dr. Hamilton Allen on May 14, and found the condition of things as mentioned. There was then considerable fulness in the left fornix. The os uteri was patulous, and there was sanious discharge from it. It was decided to dilate the uterus and explore the cavity. This was done, with a negative result. At the same time the friends were told that an operation would in

all probability be necessary. I saw her again with Dr. Allen on the 19th, and decided that if there were any change for the worse, abdominal section should be performed. From the 20th to the 22nd, pain and distension increased, and the temperature range, which previously had been nearly normal, varied from 100° to 102°. The bowels could not be moved by enema. On the 23rd she was operated upon. Bland-Sutton was present.

On opening the abdomen, a large sac, *extending above the umbilicus*, was discovered. To the anterior surface of this the bowel was adherent in parts, and also the omentum. It was firmly fixed posteriorly, and quite impossible to separate. On tapping the sac, after careful protection of the bowel with sponges, it was found to contain semi-coagulated blood. The sac wall was, therefore, freely opened, and the contents turned out. The edges were pared, and the sac was stitched by interrupted fishing-gut sutures all round to the peritoneum, which was then brought together and sutured, leaving sufficient space for a drainage tube. The abdomen was closed by three sets of sutures, and a drainage tube left in. The temperature remained normal after the operation, and the tube was removed on June 1. The patient made an uninterrupted recovery. My first impression on seeing this case was that it was one of extra-uterine fœtation, the date of which could not be determined upon from the previous history, or that it might be a pelvic hæmatocele caused by the rupture of a hæmato-salpinx, and possibly due to an early miscarriage. I was astonished on seeing the size of the sac, the thickness of its walls, and the extent of the adhesions. The contents were afterwards carefully examined for the presence of a mole, but such could not be found. No tube or ovary could be detected on the left side. There had evidently been recurrences of hæmorrhage, and a recent bleeding within the few days prior to the operation explained the symptoms from which she then suffered, and the sudden increase in the size of the swelling.

CHAPTER XXXII.

AFFECTIONS OF THE OVARIES—OVARITIS.

We may thus classify the affections of the ovaries, apart from the Fallopian tubes:—

Abnormalities.
- ,, absence.
- ,, imperfect development.
- ,, foreign bodies in.

Displacements.
- Hernia.
- Prolapse.

Ovaritis.
- ,, non-cystic { acute and
- ,, cystic { chronic.

Solid tumours.
- Carcinoma.
- Sarcoma.
- Endothelioma and Gyroma.
- Fibroma.
- Tubercle.

Cystoma.
- Simple.
- Adenomatous.
- Dermoid.
- Papillomatous.
- Colloid.

Displacements of the Ovary.

Hernia of the Ovary.—This is a very rare affection. It is usually congenital and double, but its accidental occurrence as the result of strain or injury is not to be overlooked. Hernia of the ovary is generally associated with some congenital malformation of the genital organs, either uterus or vagina, or both.

Foreign Body in the Ovary.—Frank W. Haviland (*Medical Record*) reported a case where he removed an extensively adherent pus tube and ovary. The adhesion found involved the sigmoid flexure of the colon, the tube, ovary, uterus, and omentum, in a large mass. On examination of the ovary an abscess was found, inside of which a needle was discovered. The appearance of the needle (about three-quarters of an inch of an ordinary sewing needle) proved it to have rested there some time. The explanation of its presence was as follows: That it was swallowed and passed through the alimentary canal until it reached the colon, when it perforated the walls, passed on through a fold of omentum into the peritoneal covering of the

posterior wall of the uterus, and thence on into the right ovary, carrying with it infection from the alimentary canal.

Diagnosis.—A swelling is found in the inguinal region about the size of a walnut, which on coughing may protrude into the inguinal canal. In drawing the uterus down with a hook or vulsellum, the tumour is dragged on and pulled with the uterus.

An interesting case of double hernia of the ovary, with congenital malformation of the uterus and vagina, was brought before the Gynæcological Society. Hulke removed one ovary, and Heywood Smith the other.

Should the ovary be painful, with associated menstrual and reflex troubles, the best course to pursue is to remove it. A hollow shield may be worn.

Prolapsus.

Varieties (Mundé):
- Retro-lateral.
- Retro-uterine.
- Ante-uterine.
- In the infundibulum of an inverted uterus.

Causes:

- Pregnancy and parturition.
- Uterine displacements.
- Congestive states.
- Sudden jolts, etc.

Diagnosis.—On examination by the vagina and rectum, the sensitive ovary is felt in its altered position.

Treatment.—Avoidance of coitus; the hot vaginal (medicated) douche; a course at Woodhall Spa; such aperient waters as those of Victoria and Hunyadi Janos; bromides internally. A soft air or glycerine ring pessary is often of service, or the Hodge with glycerine air-pad. The patient should sleep with the bed raised about six inches at the foot. Mundé has devised a special pessary for lateral prolapse, but the surgeon may mould a soft pessary to the required shape, according to the position of the ovary.

Posterior Colpotomy.

The prolapsed ovary may have to be removed by drawing it down with an ovum forceps through an incision in the posterior vaginal

PLATE XX.



SECTION OF OVARY, SHOWING FOLLICULAR CYSTS—WITH THICKENED FALLOPIAN TUBE: FIMBRIÆ NORMAL. (Author.)

PLATE XXI.



SECTION OF OVARY, SHOWING CYSTS IN THE WALL, AND ONE LARGE OLD FOLLICULAR CYST—ADHESIONS ON THE ENLARGED FALLOPIAN TUBE AND ACCESSORY OSTIA WITH SMALL PEDUNCULATED CYST OF MORGAGNI.

[To face p. 650.

PLATE XXII.



Ovaries, showing in the Right a Cyst with Coagulum; in the Left Old and Recent Corpora Lutea.

PLATE XXIII.



Bilocular Cystic Ovary with Fallopian Tube

[*To face p.* 651.

wall, ligaturing and cutting off by scissors, if need be leaving the incision open for drainage.

OVARITIS.

Ætiology, Causation, and Pathology.—Not long since ovaritis was associated generally with perimetric inflammations, as it is most frequently met with either as a complication or extension of these affections. 'We believe,' says Emmet, 'that the ovaries suffer far more from peritonitis or cellulitis in their vicinity than from disease originating within or confined to their own structure.' Still, it is doubtful whether inflammation of the pelvic peritoneum may not more frequently originate in the ovary (Aran) or Fallopian tube than we think. The ovary is more or less involved in every severe case of perimetritis. On the other hand, uterine inflammatory conditions may arise as secondary results of both acute and chronic ovarian hyperæmia and inflammation.

Active hyperæmia, however, of the ovary may persist for a length of time, without further consequences than hypertrophy of the connective tissue and interstitial thickening, with effusion. This hyperæmia leads to areolar thickening, and this to pressure on, and obliteration of, the follicles, and this causes further cicatrization of the connective tissue, and, ultimately, a cirrhotic state of the organ. In the thickening of the peripheral layers of the stroma we have a satisfactory explanation of the accompanying sterility, for the ripened ovum cannot escape. Abscess and cystic degeneration are the occasional results of either acute inflammation or prolonged congestion. Cysts may form from the extravasation of blood, and the degeneration and absorption of the coagulum.

I give Petit's classification of ovaritis and its complications:—

Ovaritis—Non-cystic	Acute	Cortical.	
		Interstitial.	
		Parenchymatous.	
	Chronic	Cortical	Hypertrophic.
		Disseminated	Atrophic.
Ovaritis—Cystic			
(*a*) Hydro-cysts	Dropsy of the follicles.		
	Dropsy of the stroma.		

(*b*) Hæmato-cysts
- Follicular
  - Multiple and small — Due to infection.
  - Larger and fewer in number — Due to perimetric inflammation.
- In corpora lutea.
- In stroma
- Mixed.

(*c*) Pyo-cyst.

Cortical Ovaritis.

Bonnet and Petit * describe the ovaritis of cortical origin as secondary to inflammation around the ovary, commonly caused by

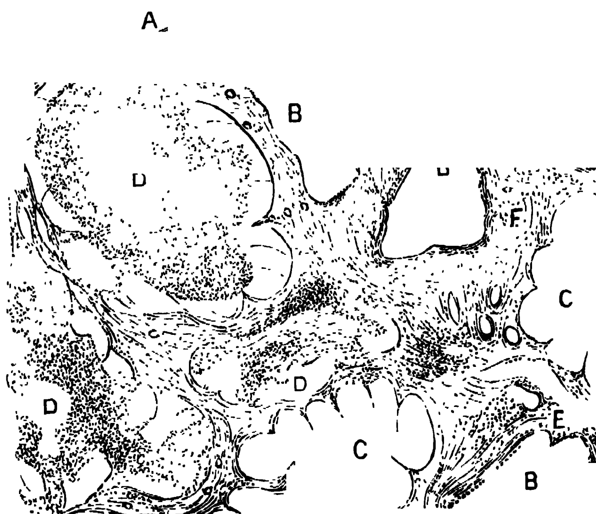


Fig. 502.—Chronic Cortical Ovaritis. (× 30 diameters.) A, A, Sclerosis of albugineous layer; B, B, follicular cysts; C, C, corpora lutea degenerating; D, D, the same, separated by hæmorrhagic infarctions; D, corpus luteum changed into a small hæmorrhagic cyst; F, E, interstitial hæmorrhages; F, interstitial tissue in process of sclerosis (Bonnet and Petit). Compare with Normal Section, Fig. 503.

gonorrhœa. In it the serous covering of the ovary is affected. It is enlarged, and its capsule is thickened. Diffuse interstitial ovaritis is due to puerperal infection; the ovary is largely increased

* *Lib. cit.*, for this pathological summary.

in size, engorged with fluid, and the cystic follicles have either serous or sanguineous contents, the stroma being the seat of a diffuse embryonic infiltration. Later on pus appears in the lymph

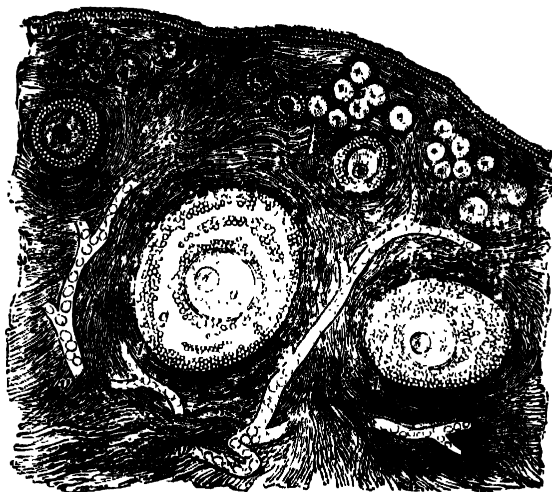


FIG. 503.—SECTION OF NORMAL OVARY. (× 30 diameters.) *e*, Fine connective tunica albuginea; *s*, spindle-celled layer of the zona parenchymatosa or stroma; 1, 2, 3, Graäfian follicles, the largest of which are internal, but grow towards the surface. (Macalister.)* See also Fig. 506.

spaces or the follicle. Parenchymatous ovaritis is due to infectious diseases. The lesions are concentrated in the corpora lutea, or the primordial follicle is exclusively attacked or completely disappears.

* 'Each Graäfian follicle consists of (1) a tunica fibrosa, or the differentiated envelope derived from the adjacent part of the stroma, which consist of fine connective-tissue with spindle cells; (2) a very delicate structureless membrana pellucida; (3) an irregular thick epithelial layer of columnar cells, the membrana granulosa, which at one part is thickened, forming the discus proliferus; (4) within this is a drop of clear *liquor folliculi*, in which floats a nucleated cell, the ovum. Rupture of a Graäfian follicle occurs at each menstrual period, and the cavity of the burst follicle becomes filled with an exudation of a peculiar reddish-yellow colour, becoming cicatricial tissue, with a radial arrangement of its fibres, formed by the infiltration of the stroma cells and the follicle, and their proliferation as a folded wall, corpus luteum, which gradually diminishes by the growth into it of normal stroma cells after the tenth day, but does not disappear for about two months. If the ovum becomes impregnated, the corpus luteum is large, and shows a trace of a central gravity owing to the increased vascularity of all the parts, and does not disappear for about eight months. Some new follicles collapse and shrivel without rupture.'—'Text-Book of Human Anatomy,' by Alexander Macalister, F.R.S.

In chronic ovaritis the connective tissue is gradually transformed into dense and undulating fibrous tissue, poor in cells and blood-vessels. The connective tissue is thickened around the vessels, encroaching on the corpora lutea and the ovarian follicles. Such a condition leads on to sclerosis, and in the new formation are variously shaped spaces, remains of bloodvessels, lymphatics, or ovisacs, thus leading up to the serous, sero-sanguineous, and sanguineous cystic condition. In chronic cortical ovaritis the ovary is surrounded by false membranes, in which may be found sanguineous collections. The process of sclerosis invades, with varying degrees of thickness, the ovary ; the resulting obstruction to the circulation favours a serous effusion into the follicles, and possibly hæmorrhagic infarctions. The consequence is a general disorganization of the ovary, in which a sclerosed capsule, cystic follicles, hæmorrhagic cysts, hæmorrhagic interstitial effusions, and interstitial sclerosed changes, are found on a section of its substance.

Other Forms of Chronic Ovaritis.

The remaining forms of chronic ovaritis are distinguished by varying degrees of hypertrophy and development of fibrous tissue in the interstitial stroma of the ovary, around the vessels and in the vicinity of the ovisacs and the follicles. The consequence is a contraction of the ovarian stroma, which presents, at least in part, an atrophic or *cirrhosed* condition. Mingled in this cirrhotic tissue are small purulent deposits, the remains of separated follicles and cystic cavities. Such pseudo-hypertrophic changes are to be kept quite apart from *true hypertrophy* (Lawson Tait and Slavjansky), in which the normal tissues of the ovary are greatly enlarged, often to the extent of 60 to 70 grammes (Tait).

Colloid Degeneration of the Ovary.—Under this name Mary Dixon Jones has described what she calls 'the fourth hitherto undescribed disease of the ovary.' It is a form of degeneration which affects especially the ova themselves. It takes the form of an infiltration of the whole ovary with colloid corpuscles. Not only the ova, but also the interstitial connective tissue and the walls of cysts become affected. In advanced cases, not a single healthy ovum is found in the whole ovary. When an individual ovum so affected is examined under a very high power, it is seen that the colloid change involves the endothelial covering of the ovum, the yolk, the nucleus, and

even the nucleolus. This form of degeneration is regarded as due in every case to some form of infection, dating, in most cases, from an attack of gonorrhœa, or from sepsis, complicating childbirth. It is frequently found in conjunction with endothelioma and gyroma; and the former is described as being itself the seat, in some cases, of colloid degeneration.

Fig. 504 gives a general view of an ovary affected with this form of degeneration. Figs. 505, 507 show how the disease attacks the

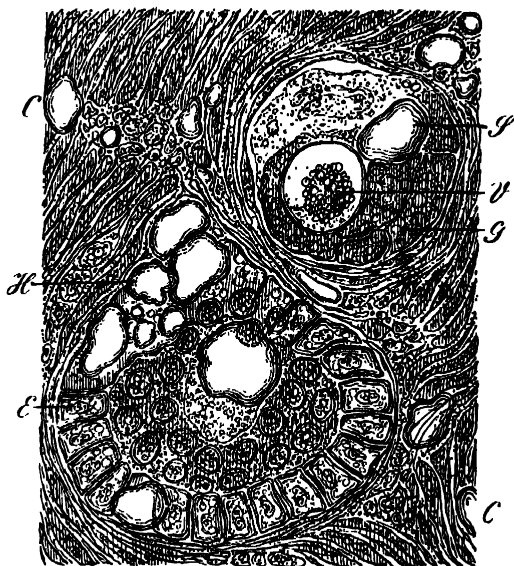


FIG. 504.*—OVA IN A HIGH DEGREE OF COLLOID DEGENERATION. (× 600.) *S*, smooth colloid corpuscle; *G*, granular colloid masses; *V*, shrivelled, colloid vesicula, in a vacuola; *H*, heap of colloid corpuscles, mostly in the epithelia; *E*, short columnar epithelia in an incipient colloid infiltration; *C*, *C*, colloid corpuscles in the muscle tissue of the ovary. (Mary Dixon Jones.)

ova. In sections showing colloid degeneration, the tissues other than the ova themselves generally appear in a condition of acute inflammation.

CYSTIC OVARITIS.

Hydro-cystic.

In the *hydro-cystic* degeneration of the ovarian stroma there is an attendant sclerosis. The follicular cysts are unilocular and

* See also Figs. 505, 506, 507.

spherical, varying from the size of a small cherry to a walnut, and occasionally larger. Such cystic degeneration, with the associated hypertrophic changes, may increase the size of the ovary to that of the closed fist. On section the cyst presents a wall with a double contour and a smooth surface, and it is filled with a colourless and limpid fluid. Ovules are not found in those of a smaller size. They disappear in the cell-proliferation which accompanies the

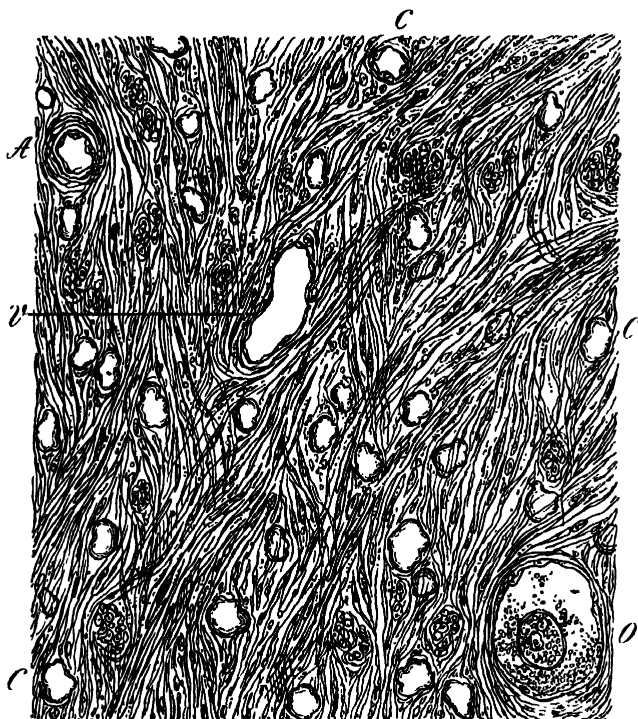


FIG. 505.—COLLOID DEGENERATION OF THE OVARY. (× 500.) *C*, *C*, colloid corpuscles; *O*, ovum; *A*. artery; *V*, vein. (Mary Dixon Jones.)

cystic formation, when the normal epithelium passes into a granular or colloidal degeneration. These dropsical follicles are situate in a surrounding bed of sclerosed ovarian tissue. With this the wall of the follicle is finally blended, so as to destroy all trace of the distinctive follicular wall. This hydro-cystic change in the follicles of the ovary may be attended by a corresponding dropsical degeneration (serous pseudo-cysts) in the stroma, the result of œdema.

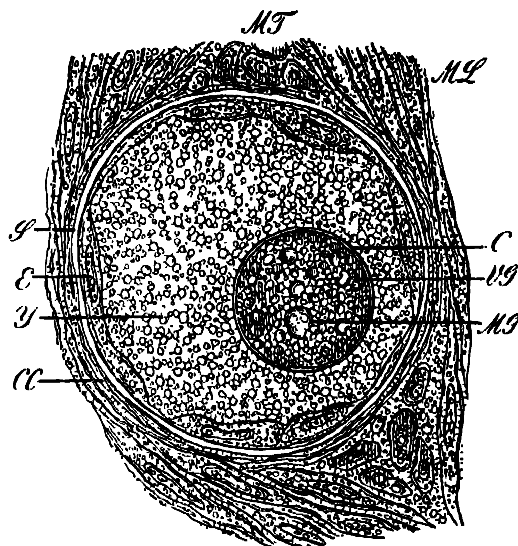


FIG. 506.—NORMAL OVUM. (× 1200) *MG*, macula germinativa; *VG*, vesicula germinativa; *C*, cuticula; *Y*, yolk; *E*, flat epithelium; *S*, structureless or basement membrane; *CC*, connective tissue capsule; *ML*, smooth muscle fibres in longitudinal section; *MT*, smooth muscle fibres in transverse section. (Mary Dixon Jones)

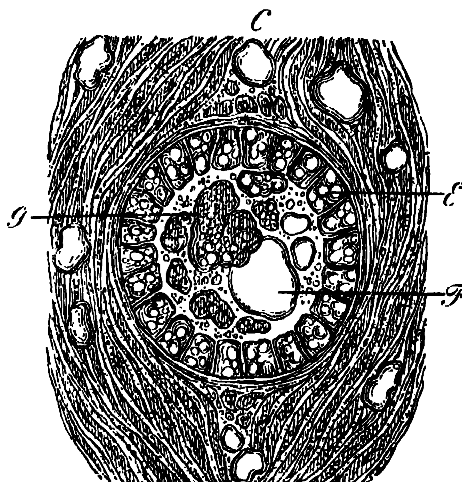


FIG. 507.—COMBINED FATTY AND COLLOID DEGENERATION OF OVUM. (× 600) *E*, short columnar epithelium, in colloid infiltration; *F*, fat globules; *G*, coarsely granular colloid masses; *C*, colloid corpuscles in muscle layer of ovary. (Mary Dixon Jones.)

Hæmato-cystic.

The *sanguineous* or *hæmorrhagic cysts* vary greatly in size. (I have removed two such cysts unruptured from one patient, each of which was the size of an orange.) The smaller or multiple (hæmato-follicular) are disseminated throughout the entire ovarian stroma; this, according to Petit, represents the mode in which septicæmic ovaritis affects the organ. The larger ones are

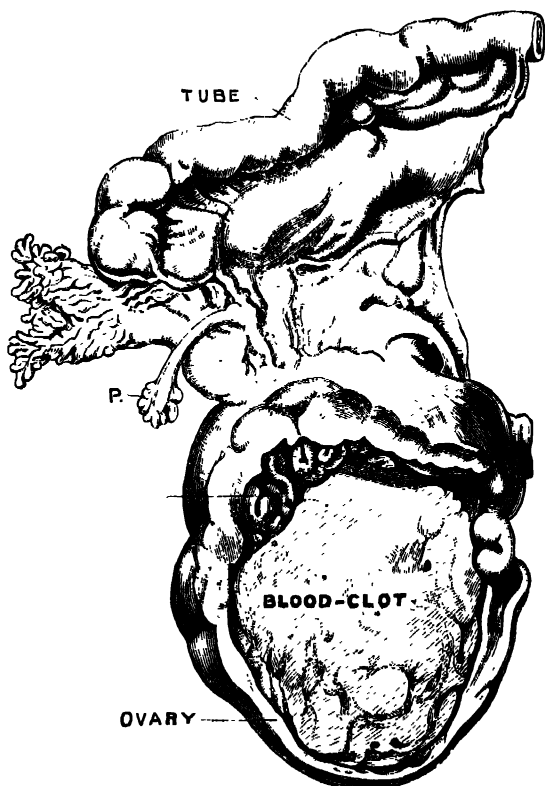


FIG. 508.—APOPLEXY OF THE OVARY. (Doran.)

more probably due to a hæmorrhage into the interior of a hydrocyst. This variety is associated with a cortical sclerosis. The cyst has a fibrous wall of varying consistence. The parietal epithelium is altered or, more generally, destroyed. Other blood-cysts are associated with the physiological rupture of the Graäfian follicles. The microscopical features of such cysts serve to distinguish them.

In the interstitial hæmorrhagic cyst the flow of blood has been more diffused. The extravasated blood becomes encysted, and the entire substance of the ovary may thus be of the consistence of the splenic pulp. This class of hæmorrhage more frequently follows acute ovaritis.

Double Paroöphoritic Blood-cysts.

I removed the ovaries and Fallopian tubes of a patient, aged thirty-nine (married, one child), who had first come to me in 1889 with retroversion of the uterus and enlarged ovaries. Notwithstanding palliative treatment, she continued to suffer great pain, and life became intolerable. On operating, a large paroöphoritic cyst, with the Fallopian tube lying over it, was found *at either side.* The cysts were filled with blood. The recovery was uninterrupted.—*British Gynæcological Journal*, 1893.

Fig. 508 represents '*apoplexy of the ovary'—the chronic hæmato-cystic hæmorrhage of Petit.* It shows a tumour removed by Alban Doran.* In referring to this case Doran says—

'The general appearance of the diseased ovary, and the relations of the corpus luteum to the cavity, indicated a pathological condition which bore no relation to incipient cystoma of the organ.

'No rent nor cicatrix of a rent, nor any aperture nor fistulous track, could be detected on the surface of the ovary. The two dilated follicles bore no cicatrices.

'The tumour consisted of the right ovary. It weighed two ounces, and measured two inches and a half in vertical diameter, and one inch and five-eighths horizontally. The surface was of a dull drab colour, and puckered. A large, single-chambered cavity occupied the interior of the ovary. It was filled with a tough yellow substance. The membrane in zigzag folds was deficient towards the yellow substance, so that it partially enclosed a space (resembling in all respects the cavity of a well-formed corpus luteum) which, where not bounded by the membrane, opened out against the yellow substance. On removing the substance from the cavity in which it was embedded in one of the half-sections, the space partially enclosed by the zigzag membrane was found to open out into that cavity. The above appearances indicated the rupture of a mature follicle into the stroma, with subsequent hæmorrhage.'

Alban Doran remarks that Olshausen, in his excellent 'Krankheiten der Ovarien,' divides ovarian apoplexy into two varieties: hæmorrhage into the follicles and hæmorrhage into the stroma. In pure examples of the second variety, which follow local congestion and are seen as complications of scurvy, typhoid and other fevers, the stroma becomes converted into a spongy substance full of fluid blood, resembling the spleen.

'The present specimen, as proved by the appearances described, is an example of ovarian apoplexy originating in a follicle, but involving the stroma

* *Obstetrical Society's Transactions*, 1890.

through rupture of the follicle. Olshausen, who recognizes this secondary form of hæmorrhage into the stroma, describes an apparently similar case. Whilst small apoplexies disappear, as a rule, through reabsorption, and leave no trace behind, large effusions may lead to the partial or complete destruction of the parenchyma, involving in the latter case the conversion of the ovary into a single cyst, filled with a thick, greasy mass.'

Pyocystic Ovaritis

Begins generally in the ovisacs, or in the lymphatic spaces in the form of small multiple abscesses, which are gradually blended by fusion of their walls through necrosis of the interposed embryonic tissue. The size varies. They frequently are imbedded from within outward in embryonic, fibrous, and cellulo-vascular tissue. Bonnet and Petit record a case in which a follicular cyst contained an abscess the size of a pigeon's egg. This cyst was situated near a larger cyst of the same nature, the contents of which were serous and the surrounding stroma was normal. The pyogenic germs they consider were carried by the vessels of the hilum. They point out that an ovarian abscess in developing itself has a tendency to double over the broad ligament, so as to assume the appearance of a phlegmon of the latter.

Briefly I may summarize the progressive changes that occur thus—

1. *Follicular degeneration of Graafian follicles.*
2. *Interstitial changes in the stroma—neoplasms, sclerosis, cirrhosis, encysted abscesses.*
3. *Sub-peritoneal thickening of the albuginea due to peritoneal inflammation.*
4. *Various adhesions of the ovaries to the surrounding pelvic structures.*
5. *Liquefaction of interstitial effusions of lymph and blood, furnishing secondary serous, caseous, and sanguineous contents of cysts.*

We are especially indebted to Nagel, Gusserow, and Petit for more accurate knowledge of these pathological changes.

Causation.—A case of uncomplicated ovaritis is rare. Still, we occasionally meet with it, both as a result of chill taken at the menstrual period, and in the early stages of gonorrhœa.

Zymotic Causes.—During my eleven years' connection with the Cork Fever Hospital, I saw marked cases of ovaritis in patients suffering from typhoid fever. It is of course impossible in such cases, or in the exanthemata, to say how far the ovaries may have been involved by previous inflammatory

or degenerative changes. Again, in typhoid fever we can readily understand how the ovaries may become involved in the adjacent peritoneal and glandular mischief.

Matthews Duncan attributed the occurrence of ovaritis frequently to the abuse of alcohol. Reflex excitement of the ovarian nerves may originate it, much in the same manner as orchitis occurs in the male. Hence we have it following excessive sexual intercourse, masturbation, and the passage of the uterine sound. I have no doubt that such reflex nerve disturbance frequently leads to more grave results than we could possibly anticipate from so slight an exciting cause as the use of the sound. I believe analogous febrile conditions in the female, as that which Sir Andrew Clark drew attention to in the male as arising from the passage of the catheter, may be accounted for in precisely the same manner.

Diagnosis.—The enlarged and painful ovary may be felt (*a*) by palpation, through the abdominal wall; (*b*) by the vagina, by a careful digital and bimanual examination; (*c*) by rectal exploration, and especially by the conjoined recto-vaginal examination. It may vary in size, feeling about the size of a large almond, or even of a pigeon's egg. Pressure on the ovary excites pain. Unfortunately, however, pain in a neurasthenic woman can be greatly exaggerated. We must largely discount this exaggerated sensitiveness complained of when making our diagnosis, and not attach too great an importance to it.

'Who,' asks Emmet, 'are the sufferers from a condition which has been termed an *irritable ovary*? The young girl who has had her brain developed out of season; the woman who has been disappointed or crossed in love by some man not worthy of her' (and, he might have added, the girl who is made the subject of unsatisfying and exciting embraces, foolishly permitted and condoned during long engagements); 'those who have been ill-mated and often unmated; she who has sold her person, under the guise of marriage, for money or position; the prostitute; and she who degrades herself and sacrifices her womanhood by resorting to means to prevent conception. In all of these the nervous system has been first abused, and then nutrition has suffered some accident only locating the effects in the ovary.'

Symptoms and Physical Signs.—These will depend on the severity of the attack, the presence of any collateral disease, or the acute or chronic nature of the affection. Ovarian congestion may be accompanied by any form of pelvic or uterine inflammation. Hence the gravity of the symptoms will depend on the nature and course of the attack. This, as we have seen, may cease at active hyperæmia,

or may run on to pelvic abscess and pyo-salpinx or ovarian abscess and pyo-cyst. Ovaritis, acute and chronic, may be attended by any or all of the following symptoms: oöphoria; dysoötocia; dysmenorrhœa; dyspareunia; hysteria and hystero-epilepsy; various remote (reflex) pains; neuralgia; inability to walk; pain in defæcation; sterility. (See chapter on Uterine Reflexes, p. 321.)

Treatment.—Complete rest when there is any acute inflammation; the knee-elbow position assumed for some time daily; the bed or couch on which the patient lies may have the foot raised about four inches by blocks of wood or long castors, as suggested by Heywood Smith; avoidance of sexual intercourse; leeches to the inguinal region of the anus; vesication over the inguinal region; iodine paint applied over the same part, or a combination of chloroform

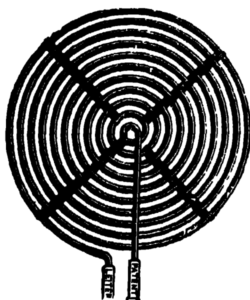


Fig. 509.—Leiter's Irrigator.

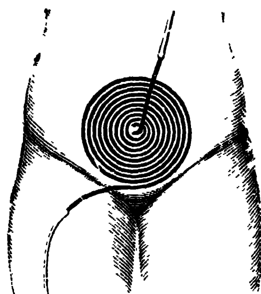


Fig. 510.—Leiter's Irrigator Applied.

(℥i.), liniment of belladonna (℥ss.), mastich (ʒii.), camphor (ʒii.), and rectified spirit (℥i.), applied with a thick brush. This is an admirable application to relieve pain. It forms a pigment, and can be reapplied daily. Leiter's irrigator can be applied during inflammatory states. The bromides can be given internally, and, in the chronic stage, iodide of potassium. If dysmenorrhœa, hysteria, hystero-epilepsy, neuralgia, persist, and render the woman's life miserable, the operation of removal of the appendages is to be considered, and, after due consideration, performed.

*Diseases of the Ovaries and Fallopian Tubes in Children.**

We may classify the affections of the ovaries in childhood under the head of malformation, hernia, cystoma, sarcoma, carcinoma,

* I have already referred to the importance of rectal examination in the diagnosis of diseases of the genital organs in children. The most complete

tuberculosis. Bland-Sutton has described the tumours of the oöphoron, under the head of the oöphoronomata, and a hundred cases of ovariotomy in children under sixteen, as performed by various surgeons. Such tumours may arise in the connective tissue of the oöphoron or, as Doran has shown in a case, its embryonic tissue. Most cystomata in children are found when the girl approaches puberty, as large a proportion as one-half being found in girls about the time of puberty.

Diagnosis.—The danger of overlooking a tumour of the genital organs in children, or of mistaking it for an enlargement or growth from some other organ, is greater than the liability to error once such a condition is suspected. Under chloroform, the bowel and bladder being empty, there can be little difficulty, by a gentle yet thorough rectal and vaginal examination bi-manually, of detecting tumours of the adnexa.

Cystomata, Kelly classifies as adeno-cystomata, unilocular cysts, dermoid cysts. At the Johns Hopkins Hospital, one-third of the ovarian tumours found in children were dermoids; and, from a case reported by Emanuel, it would appear that a tumour of this nature may become malignant, in his case recurrence taking place after complete removal of the cyst, sarcomatous elements having been found in its stroma, the secondary sarcoma occurring in the omentum and abdominal wall. There are six cases of carcinoma of the ovary in children recorded. Kelly gives an analysis of 126 cases of tumours of the ovary occurring in children, in which ovariotomy was performed, 50 per cent. of the children operated on under four dying after operation, whereas in those of more advanced age the mortality was much lower. In the 126 cases there were 22 deaths.

Analyzing these 126 cases, we find that there were 30 simple cystic or monocystic tumours, 24 multilocular cystoma, 1 adeno-cystoma, 43 dermoids, 3 teratoma, 16 sarcomata, 1 myxo-sarcomata, 1 semi-solid tumour, 1 papillary cystoma, 6 carcinomata.

In children the proneness to omental, renal, and mesenteric tumours, tubercular and other, have to be remembered, though this does not exclude the possibility of hepatic, splenic, or pancreatic growth. As regards the treatment of ovarian growths, operation is, whenever possible, the one plan of treatment.

Turning to inflammatory conditions of the adnexa, the relationship

contribution that has hitherto appeared is that of Howard Kelly, in the 'Cyclopædia of Diseases of Children,' vol. v., supplement; and to him I am indebted for the information in the text.

of vulvo-vaginitis to ovaritis and salpingitis has to be noticed, Mark's post-mortem examinations showing 10 per cent. of pus tubes; and the important observation has to be made that pyrexia, abdominal pain, with general constitutional disturbance and painful micturition, may be due to adnexal inflammation, to be detected by rectal examination. Appendicitis also may accompany the ovaritis. The exanthemata, especially where the exanthem occurs in a child of strumous constitution, may be attended by an attack of salpingo-ovaritis. Gonorrhœa, also, is to be remembered as another source of infection. In a table published by Kelly, of 115 cases, 97 had a gonorrhœal origin. The importance of this relationship between vulvo-vaginitis, the presence of the gonococcus, and suppurative disease of the adnexa in children, cannot be overestimated. Kelly records 22 cases of tuberculosis of the adnexa in children, of ages varying from 1¾ years to 15 years. In half the number the disease occurred before the age of six.

Primary genital tuberculosis in children is extremely rare, but few authoritative cases having been recorded.

CHAPTER XXXIII.

AFFECTIONS OF THE OVARIES (continued).

THE OPERATION OF CŒLIO-SALPINGO-OÖPHORECTOMY

AND THE CONSERVATIVE SURGERY OF THE ADNEXA.

Indications for the Operation, Abdominal and Vaginal.

DIFFERENCES of opinion still exist as to the grounds on which it is justifiable to remove a woman's ovaries and uterine appendages.

It is no exaggeration to say that statements, as regards the responsibility, even the criminality, of those who hold for the operation, have been made that ought never to have found a place in scientific discussions. This is the more to be regretted, seeing that those who have thus intemperately declared themselves are clearly biased, and, in some instances, have shown a petty spirit of personal animus to certain distinguished operators. It is the more unfortunate, as such opinions and expressions are repeated, and are often retailed in exaggerated terms by patients or their women-friends, who have of late come to discuss removal of the ovaries by the surgeon much as they would the alteration in some fashionable costume by their dressmaker.

The question remains, On what grounds are we justified in removing the ovaries and appendages in a woman for disease in the ovaries or Fallopian tubes? Every now and then we meet with cases in which every known means has been tried to combat pain, to enable a patient to walk, to tide over with safety menstrual periods, to reduce localized swellings which recur in the broad ligaments and pelvic peritoneum ; in short, to render life bearable and enable the patient to move about in society.

In many of these cases we can date the commencement of such to some attack of perimetritis. There may have been a gonorrhœa. In others we find nothing definite : some history of dysmenorrhœa, menorrhagia, periodical peritoneal attacks, sterility and futile operations on the cervix, with all those symptoms included under the ambiguous term of chronic ovaritis. Examination by the vagina reveals at the most a sensitive uterus or one drawn out of place by

an old adhesion, a displaced or painful ovary, or some localized swelling. It is in such women that salpingo-oöphorectomy appears to be called for and justifiable.

We have, however, to consider the inherent difficulties—indeed, we may truthfully say the impossibilities, of exact diagnosis. No man has shown this latter contingency more clearly than Tait himself. He has again and again exhibited specimens of ovaries and diseased Fallopian tubes, removed under circumstances far different from those for which this operation was originally proposed, and even carried out. A tense and distended Fallopian tube has been mistaken in vaginal examination for fibromyoma; hydro- and pyo-salpinx have been mistaken for ovarian tumour, and *vice versâ.* The menorrhagia, dysmenorrhœa, and localized swelling which are present in pyo-salpinx, are not in themselves sufficient to secure an accurate diagnosis, and it must always occur, even to the most distinguished surgeons, that only by an exploratory operation can the extent of the disease be arrived at. In a letter to the author on the subject, Tait said: 'Concerning the removal of the uterine appendages, the points that I want to lay stress upon are, chiefly: First, that no operation for the removal of the uterine appendages ought to be left unfinished. *The opprobrium of all this class of work will in the future be unfinished operations. They are far more difficult than any other operations in abdominal surgery, and therefore their undertaking should be limited to a relatively small number of men.** Second, that if for chronic inflammatory disease it is necessary to remove one set of appendages, both ought to be removed, because a second operation will in all probability be required, and these second operations are far more dangerous than the first.'

I have known some startling instances of the truth of Spencer Wells' statement that cases are by no means few where operation

* This statement of Tait's is one which all experienced operators will confirm: Salpingo-oöphorectomy may be either one of the most simple or most difficult operations, according to the complications met with—adhesions, blood cysts, myomata, purulent collections, displacements of the adnexa, intestinal complications, etc. Tait's second conclusion is not now accepted, and no surgeon would be justified in removing both adnexa unless there were unmistakable proofs of disease in them. Also, no surgeon is justified in removing an ovary on which a conservative operation can be performed, the Fallopian tube being also healthy, which will preserve even a small portion of healthy gland. It is of the greatest importance to a woman not to sacrifice the whole of an ovary if part can be retained. It is equally important to save the healthy Fallopian tube, and so to deal with the oviduct as to leave it patent and capable of discharging its functions.

has been advised and declined by the patient or consultant, yet recovery has followed other treatment, and the unmutilated woman has married and borne children.

A most distinguished surgeon at San Francisco stitched the cervix for laceration, the uterus having been previously curetted for what was thought to be fungoid endometritis. The lady was subsequently under my care. The uterus was then enlarged, very sensitive, and there was a discharge from the endometrium. The ovaries were both slightly enlarged. She underwent a course of treatment at my hands, including a protracted stay at Woodhall Spa. She returned to America, and after a time, her symptoms returning, she was urged to have oöphorectomy performed. She refused to do so without my consent. This, after a full correspondence, I would not give. Suffice it to say that I was present at the accouchement of that lady in London in 1889, and that when I last heard of her she was in perfect health. I merely quote this particular case to establish the truth of the statement made in the text. (See also 'Conservative Surgery of the Adnexa.')

Pregnancy after Oöphorectomy and Removal of an Ovarian Blood Cyst; the other Ovary being atrophied and adherent.

This case shows the discrimination that must be exercised before *both* appendages are ablated.

In 1893 I removed an ovarian blood cyst from a patient under peculiar circumstances. She was thirty years of age at the time of operation, and had been married for seven years, never having conceived. In 1883, at the age of twenty, she had an attack of pelvic peritonitis. In 1884 she had a recurrence, which spread into general peritonitis of a most alarming character, and which nearly proved fatal. This was in January, and six months later there was another attack. On and off after this she suffered from abdominal and pelvic pains, but gradually improved. In 1886 she was married; in 1889 she consulted me for a severe cervical erosion, and there was then decided enlargement of the left ovary. I treated her, cured the uterine affection, and sent her for a course to Woodhall Spa. During 1892 the recurrent pains from which she had suffered more or less for years became more constant, and at last, especially at the right side, were incessant. In February, 1893, I performed salpingo-oöphorectomy, Heywood Smith assisting me. On opening the abdomen, the peritoneum was found extensively adherent to the bowel, which latter was opened for a short distance in trying to make the peritoneal incision. Another peritoneal opening had, in consequence, to be made in the left inguinal region. The sac of the left ovary was found about the size of an orange, and full of blood, completely bound down by adhesions, which were separated with difficulty. The cyst with the left tube was removed entire. *On seeking for the right ovary, it could not be found, and it was only after considerable searching that it was detected firmly attached to the pelvic wall,* to which it was fixed by adhesions, and considerably reduced in size. The prudence of removing it was discussed, but in

the face of the protracted operation and the exhausted condition of the patient, it was considered wiser not to subject her to any additional shock, which the attempted removal of the firmly-adherent and apparently atrophied ovary would involve. A drainage tube was inserted after operation, and she made an uninterrupted recovery. Menstruation continued, and on and off she suffered again from pelvic pains in the right side, and in 1894 there was a distinct swelling to be felt in the right broad ligament. This disappeared, but there was always more or less distress and pain, especially with the menstrual periods. Towards the end of 1895 menstruation ceased, and I found that she was pregnant. She was delivered of a male child by Dr. Taylor, of Richmond, on May 31, 1896. The case carries its own lesson.

In view of the differences of opinion, both as regards the justification for, and the permanent benefit derived from, the operation of removal of the appendages, it may be well first to briefly recapitulate the indications which in the author's opinion justify the operation of removal of the uterine adnexa:—

1. Certain forms of uterine myomata which from any cause threaten life.*

2. Diseased conditions of the ovaries that resist all palliative treatment, and which both embitter and endanger life.

3. Those conditions of the Fallopian tubes, isolated or associated, which are not amenable to other means of cure, and in which sudden danger to life may arise, or where there is such constant suffering as to make life miserable.

4. Certain cases of pelvic suppuration when the adnexa are involved. These have already been dealt with in treating of pelvic suppurations.

5. Some varieties of tubo-ovarian and tubal ectopic gestation.

6. Some incurable cases of dysmenorrhœa, unaffected by any course of palliative treatment, or milder operative measures undertaken for the relief of pain, and other attendant neuroses. In these cases the association of any of the previous conditions adds to the expediency and justification of operation.

7. Those cases of epilepsy and hystero-epilepsy in which there is clear evidence of correlation between these attacks and such affections as ovaritis, ovarian displacements, enlargements, or degenerations, with or without accompanying tubal pathological conditions.

Both ovaries and both Fallopian tubes should be removed (*a*) where the operation is performed for the arrest of growth and hæmorrhage in myoma; (*b*) in dysmenorrhœa where the object is to

* See remarks on Salpingo-oöphorectomy for Fibromyomata.

produce premature change of life; (*c*) in neuroses associated with dysmenorrhœa, recurrent ovaritis, displaced and sensitive ovaries; (*d*) where both ovaries and both tubes, or one ovary and both tubes, are so diseased that no conservative operation is feasible or advisable.

8. *The operation is only to be undertaken after full consideration, and when the consequences are placed before the patient and her immediate relatives, and her full consent obtained.*

Nor should the patient be allowed to believe that the operation of oöphorectomy or salpingo-oöphorectomy is always a simple one. On the contrary, peritoneal adhesions to the intestines, deep pelvic attachments of the ovaries and tubes, ovarian cystic collections of blood and pus, pyo- and hæmato-salpinx, may render it a most difficult matter to remove the appendages cleanly and aseptically.

(The special indications for the step in the instance of uterine myomata have been already fully and separately dealt with.)

It is due to that most original surgeon and pathologist, Mary Dixon Jones, of New York, whose excellent surgical and pathological work is well known, to refer to her opinions on this question—one of such vital moment to her own sex.

Enumerating the conditions in which the operation should be performed, she includes the following—Plastic peritonitis with pseudo-membranous adhesions; purulent peritonitis, with abscess, the consequence of adnexal disease; gyroma, with varicose states of the nerve fibres; gonorrhœal salpingitis with pyo-salpinx; sarcoma and carcinoma of the ovary, with other solid tumours of the gland. She does not approve, save where there is hopeless disease of the organs themselves, of removal of the adnexa for any neurotic condition, constitutional disturbance, or for any reason save incurable disease. She insists that it is not always possible to tell by the ocular appearances whether an ovary is sufficiently diseased or not to warrant removal, and she quotes cases in which dependence upon naked-eye appearances would have led to the most serious consequences, both endothelioma and cancer being present, though not suspected. Some of the most serious cases she has ever operated upon gave no naked-eye evidences of disease. In the majority of cases of pyo-salpinx, extra-uterine pregnancy, hydro- and hæmato-salpinx, operation is indicated. As she well says, it is only by accident that such patients ever become well without operation, and the risks run by postponement are far greater in themselves than those run by operation. Nor is it to be lost sight of that the evil consequences of long-continued pelvic disease, with all its attendant troubles, reduce the patient's chances of recovery from operation while they increase its difficulties. Aglutinations of the pelvic viscera, pus sacs, with purulent infiltration, are mingled with organized adhesions, difficult to break up, and which leave extensive raw surfaces, the sources of future adhesions. 'The policy of delay works badly in every way,

women continue to be invalids, many die from inter-current attacks of peritonitis, and those who live on do so with lessened chances of recovery when they submit to operation, and greatly increased risks of but partial restoration to health.'

Salpingo-Oöphorectomy—Abdominal.

To perform salpingo-oöphorectomy, we proceed as follows:—Every preliminary precaution is taken similar to those enumerated for the operation of cœliotomy. A table capable of being utilized for the Trendelenburg position is preferable. The incision, about two inches long, is made in the middle line, and sufficiently large to admit the fore and middle fingers of the left hand. It is necessary occasionally to enlarge this incision, especially in the instance of myomata, and to use retractors to hold the margins of the wound well aside. The preliminary steps are the same as in cœliotomy, both as regards the control of all bleeding points before opening the peritoneum, and in the subsequent careful division of it. If the omentum be adherent, it has to be cautiously and gently peeled off. The fundus of the uterus will guide the finger to the broad ligament, Fallopian tube, and ovary. The Fallopian tube may be distended with fluid, and a small aspirator may have to be used to draw this carefully off. The escape of fluid has to be guarded against with a sterilized sponge or piece of gauze. It is well to have two or three flat sponges of different sizes ready to hand for use in protecting the peritoneum and intestine. I prefer the small squares of muslin, which are easily tucked in and spread over the intestine, the ends being caught in a catch-forceps. The ovary having been drawn into the wound by a long pressure-forceps (though in most uncomplicated cases no forceps is required), the Fallopian tube is well exposed. A loop of double ligature is passed through the centre of the broad ligament, avoiding the vessels. The loop is then turned back so as to include both the ovary and tube in the two loops thus formed. One free end is next passed through the returned loop, both ends are now drawn tightly, tied, and then cut off (the Staffordshire knot), or the loop is passed through the pedicle and the needle is withdrawn. The loop is now cut, and either half of the pedicle is tied, the several ends are again tied tightly in figure of eight fashion, and the pedicle is cut. Before dropping the stump back into the pelvic cavity, it is well to secure it with a clamp forceps. Any fluid or blood can be more easily and safely sponged out of the pelvis, and from the pouch of Douglas, than if this is done

after the stump is returned. When the ovary and tube are brought out of the wound they are carefully examined. If any resection or puncture is determined upon, the wound is protected by a square of gauze or muslin which is wrapped round the broad ligament attachment, and the adnexa are thus isolated. The resection of the ovary or tube is then proceeded with, or in simple cystic cases the small cysts are stabbed, and the fluid is collected with dabs of gauze or a sponge. The ovary and tube can now be removed, cutting neither too close to, nor too far from, the ligature. The stump is dropped back into the cavity. The abdominal toilet is then made. A soft drainage-tube or an iodoform gauze drain should be used if the peritoneal cavity has been washed out.

Vexatious litigation has taught the lesson that the surgeon's best course is *to have a clear understanding before operation that if the two ovaries are unhealthy, or that for any cause it is thought right to remove both adnexa, the surgeon is at liberty without future question to do so. Otherwise he may lay himself open to the most unjust and annoying attacks.*

Simple as this operation is in the majority of cases, it becomes quite a different matter if the surgeon has to deal with unexpected difficulties in the pelvis. There may be displacement of the adnexa through the presence of a uterine or intra-ligamentary fibroid; also, adhesions most difficult to detach may be encountered. Again, there may be found a cyst distended with serum, blood, or pus, to the point of rupture, and this may be fixed by adhesion to the bladder or bowel. The safe rules to adopt are, to avoid all hurry, to carefully deal with adhesions, to ligature or control by forceps the bleeding as we proceed, and to safeguard the operation by the most thorough asepsis.

Operative procedures on the pelvic viscera and the ever-varying and complex conditions found on opening the abdomen, admit practically of no fixed rule in dealing with them. The true surgical artist is he who, while conforming to broad and unalterable surgical principles, deals with each case and its complications as it presents itself to him at the time of operation, his resources limited by no rigid theoretical consideration, and his hand not held by any authoritative *ipse dixit*. Through such freedom of action can we alone hope for progress, and in no part of the human body is such liberty demanded more than it is in the surgery of the female organs of generation. It were well to bear this in mind in discussions often futile, on this or that method of procedure, and in disputations over steps of operations, the bearings of which vanish in actual

practice, when face to face with unexpected and novel difficulties and where the surgeon has to fall back on his individual judgment and surgical instinct for guidance.

The operation of vaginal-cœlio-salpingo-oöphorectomy may be performed either by anterior or posterior colpotomy. In the former case the anterior vaginal vault is opened, and in the latter the posterior.

Anterior Colpotomy.

If the anterior route be selected, the operation is performed thus: The genitals having been shaved, and the thorough sterilization of the vagina secured, the woman is placed in the usual hysterectomy position. The uterus is drawn well down, and its length and position are ascertained by the sound. The attachment of the bladder and its relation to the uterus are determined in the same manner. The cervix is now caught by two vulsella, which are held in one hand. Orthmann's combination of uterine sound with claw forceps is preferable, if it be at hand.* The sound extremity is passed into the uterus, and the neck is seized by closing the instrument so that the claw fixes the cervix externally. With this the uterus can be drawn well down so as to place it and the anterior cul-de-sac on the stretch. An assistant now passes a vaginal retractor below the urethra, and draws it up out of the way, and with the same hand he holds a pipette so as to direct an irrigating stream on the part, and allows this to play continuously during the operation. The uterus being thus fixed and stretched with one hand, with the other the operator makes an incision directly in the middle line through the mucous membrane. This is then reflected up with a few strokes of the knife. This is Martin's *longitudinal incision,* but many prefer the transverse incision through the mucous membrane at the utero-vaginal junction. The sub-mucous tissue is now cautiously divided, and the separation of the bladder is affected by finger, point of curved scissors, or cautious dissection with a scalpel. Meanwhile, the retractor is carefully used to protect the bladder, and keep it out of harm's way. The peritoneum is now sought for, caught with dressing-forceps, and divided with scissors, the blades of which are opened so as to enlarge the incision, and the opening is further increased in size with the finger. Martin's conical retractor is now slipped underneath the peritoneum so as to completely protect the bladder. The perineal retractor may now be withdrawn, and

* See Fig. 213, p. 261.

the index finger is carried into the peritoneal cavity. The adnexa and broad ligaments at either side are carefully examined, and the presence of adhesions, and the size of the ovaries and tubes determined. The perineal retractor is now replaced, and the uterus is seized and brought into the vagina. The ovary and tube at either side are next sought for, seized, brought into view, and examined. They are then either removed, punctured if cystic, or resected. If either of the adnexa are healthy, they are returned. It may not be necessary to bring the uterus forwards, for the adnexa can be hooked down with the finger, or the ovarian clamp-forceps can be used to seize the ovary and bring it into the vagina. The presence of adhesions, cysts, solid growths of the ovary, pus sacs, and myomatous tumours, will add considerably to the risk and difficulty of the operation. Here adhesions have to be carefully separated, cysts punctured, and in some cases it may be necessary, as in tubo-ovarian ectopic gestation, to combine an abdominal operation with the vaginal. It is just with such conditions present that a careful previous diagnosis must be made, and that the abdominal route will be found preferable to the vaginal.

Posterior Colpotomy.

The majority of gynaecologists prefer the posterior to the anterior vaginal route in exploration of the pelvic viscera, and for operations on the adnexa. It is without doubt the operation of selection. Palpation is easier, and the adnexa are more within reach, and are more readily drawn into the vagina, while drainage, when required, is better carried out from the pouch of Douglas. Also the broad ligaments can be more completely traced, and any effusions or tumours in them defined.

Operation. The patient being in the hysterectomy position, and aseptic precautions having been taken, a large perineal retractor is introduced, and the neck is seized with two tenacula, or Orthmann's instrument may be employed. The recto-vaginal fold is incised transversely a few millimetres behind its insertion with the neck. The incision is curved with the concavity in front, measuring some six centimetres in length. The wound may be further freed with a few strokes of a curved blunt-pointed scissors. The peritoneal cul-de-sac is now sought for, caught in a forceps and incised. By diverging the blades of the scissors the opening is enlarged, and the right index finger, introduced into the wound and carried straight

to the posterior surface of the uterus, acts as a guide to the adnexa.

These are drawn into the wound either by the aid of the index and middle finger, or with the ovarian forceps. Should there be adhesions which prevent this, the forceps held in the right hand grasps the left adnexa; and the fingers of the left hand, carried through the peritoneal opening, separate cautiously bit by bit the adhesions. When the adnexa are thus drawn out, the pedicle is tied *en masse*, or it is transfixed with a curved needle and tied in the usual manner in separate portions. It may temporarily be held with clamp forceps.

In some cases, if there be fear of hæmorrhage, the clamps may be

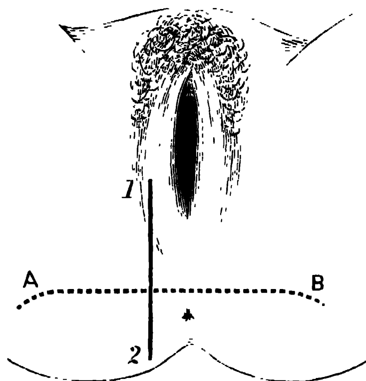


FIG. 511.—INCISIONS OF SANGER FOR VERTICAL, AND O. ZUCKERKANDL FOR TRANSVERSE, PERINEOTOMY

allowed to remain on; especially is this so if the broad ligaments are short, and where they have been much dragged about or injured. Also there are cases in which, when the bleeding continues from a high source, it is most difficult to pass a ligature, and here permanent forcipressure is the safest plan to adopt.

The same procedure is applied where both adnexa are diseased at the opposite side.

The difficulty most frequently met with in posterior colpotomy is adhesions closing Douglas' pouch; these may be so extensive as to obliterate the sac, and render the uterus immovable. Such immobility is readily felt with the finger, and it may not be feasible to continue the operation by this route.

In such cases, however, hysterectomy will generally be called for, and then the detachment of the posterior adhesions and separation of the cul-de-sac of Douglas become the major part of the operation. If pus sacs are found to be present, and the removal of the adnexa difficult, these may be opened extra-peritoneally, the sacs well mopped out with antiseptic gauze, and temporarily tamponned.

Perineotomy.—Hégar has performed perineotomy by means of an incision through the ischio-rectal space, and Sänger, in the same fashion, carries a deep incision from the side of the vulva vertically backwards to the margin of the buttock, a few centimetres behind the anus, and midway between it and the tuberosity of the ischium. Otto Zuckerkandl, on the other hand, has reached collections in Douglas' pouch by a deep transverse incision carried midway between the anus and the fourchette, exposing the levator ani and the ischio-rectal fossa. In this manner, by both methods, in certain cases a pelvic abscess has been reached and evacuated.

CONSERVATIVE OPERATIONS ON THE ADNEXA.

Salpingotomy, Salpingorrhaphy, Salpingostraphy, Salpingostomy.

American surgeons may take credit for having been among the first to advocate conservative operations on the ovary and Fallopian tubes. The names of Polk, Barlow, and Barrows, are prominent amongst American gynaecologists who practised partial amputation and resection both of the tubes and ovaries.

Artificial Ostium.

Polk first made an artificial abdominal ostium in cases of pyosalpinx, amputating the tube at some distance from the cornu of the uterus, washing it, slitting it up a little way, and uniting its serous and mucous coats by fine catgut ligatures, and bringing the new ostium thus formed into apposition with the ovary. At the same time the uterus is curetted, and tamponned with iodoform gauze. Pus may be imprisoned in two portions of the tube, either at the infundibular end by adhesions with surrounding parts, or at the uterine end by occlusion of the tube from half an inch to an inch from the cornu. Recognizing the fact that the uterus is frequently the source of salpingitis, Polk earnestly urged its thorough curettage, followed by evacuation of the recently effused lymph in the tube by opening the latter, washing it out with sterilized water, approximating its inner and outer coats, and returning it into the pelvis. I have already given a typical instance of the

value of curettage and iodoform gauze-packing of the uterine cavity in a case of pyo-salpinx, and I have frequently found distended conditions of the tubes and enlargement of the adnexa disappear after similar treatment.

Igni-puncture.

Treatment of the ovary by igni-puncture was first advocated by Polk. The small cyst is punctured with a fine galvano-cautery point, the larger ones are resected by a V-shaped incision after previous enucleation of the cysts. On the Continent, Pozzi and Martin are amongst the most prominent of those who first attacked diseased tubes and ovaries by exsection of diseased portions and the retention and return of the healthy parts into the pelvis. The operation of *salpingorrhaphy* consists of the removal of the diseased portion of the Fallopian tube and the suture of the healthy portion to the uterine stump. *Salpingostraphy* (Pozzi) is performed thus: A stylet is passed down to the uterine cavity in order to ascertain that the tube is permeable. The ovary is now seized, and a cuneiform section of it is made. To the surface thus exposed, the tube is united by a fine catgut suture. At the same time, if there be some small cysts in the ovary, these are either opened with the knife or punctured with the cautery. In the case of removal of one tube, if the other be found stenosed, A. Martin resects the latter, should its condition justify its retention. He also resects the ovary and the diseased part of the tube, forming a new ostium, and fixes it in the manner advocated by Polk. In cases of simple hydro-salpinx, a small portion of the tube is removed, and the parts are brought together (*Salpingostomy*). These operations on the tubes and ovaries combined, or on the tubes alone, must, if they are to be successfully performed, be done through the abdomen, but resection of the ovaries, their igni-puncture or simple puncture, can be effected by anterior or posterior colpotomy.

Salpingostomy.

'Skutch, of Jena, devised the operation of salpingostomy.* It was described before the third meeting of the Deutsche Gesellschaft für Gynäkologie at Freiburg in June, 1889. He operated upon a sterile patient, aged thirty-eight, with moderate dilatation of both tubes, which is said to have caused great pain, the ovaries and uterus being apparently free from disease. Some of the fluid contents of each tube were first withdrawn by means of a Pravaz

* See *Centralbl. für Gyn.*, No. 32, 1889.

syringe, and found to consist of clear yellow serum free from pus. The ostium was then laid open, the fluid allowed to escape, and an oval piece of the wall, about one square centimetre in size, cut away. The mucous membrane and serous coat were united along the margin of the artificial aperture by fine silk thread. Lastly, a sound was passed through the aperture along the tubal canal into the uterus. Convalescence was uninterrupted. From the day of the operation forward the woman was free from pain.' (Doran.)

We thus see, firstly, that tubes which are affected by simple hydro-salpinx can be preserved by resection and adaptation of the cut surfaces; secondly, that in certain cases of pyo-salpinx the diseased portion of tube may be removed, the healthy portion washed out, and union effected either with the uterine cornu or the ovary, and that a new ostium may thus be made either at the uterine or abdominal end. It is also clear that ovaries which previous to these operations would have been condemned, are now preserved, as neither micro-cystic degeneration nor limited sclerosis are sufficient to justify their removal. What, then, are the diseased states of the tubes which compel us to perform complete salpingo-oöphorectomy? We may thus classify them: those cases of hydro-salpinx in which the disease has so far extended as to approach the purulent condition, in which there is ulceration of the mucous membrane, or such distension of the entire tube as to render any conservative operation futile. In cases of hæmato or pyo-salpinx where the tube has to be removed; if the ovary be healthy, it may be left.

Suppurative or diseased ovaries and tubes which are embedded or surrounded by adhesions, should, as a rule, be removed, as they seldom regain their integrity. Hæmatocystic ovaries and tubes with thickened walls, and containing blood coagula, or blood cysts, must be sacrificed.

CHAPTER XXXIV.

THE CORRELATION OF SEXUAL FUNCTION AND INSANITY.

THE relation of disordered sexual functions to mental disease has hardly received the careful attention on the part of the profession generally that it most decidedly demands. In several portions of this work the correlation of sexual disturbance and disease in the organs of generation, or some error in function, has been incidentally referred to (chapters on Menstruation, Menstrual Disorders, Uterine Reflexes, etc.). The most frequently associated morbid psychical conditions are aggravated hysteria, various forms of dementia, phases of melancholia, suicidal tendencies, and climacteric mania. The important question is, how far is such alienation due to, or the cause of, the sexual aberration? There can be no doubt that perversion or suppression of the menstrual functions at any time of the active physiological life of the ovary, but more especially from puberty to womanhood, and during or approaching the menopause, does lead up to insane impulses, delusions, and illusions.* Short of such graver consequences we have every form of hysteria, instability of purpose, mental incoherence, and depression bordering upon true melancholia. Looking at the question from the other point of view, we have equally to remember that the healthy discharge of the sexual function is frequently interfered with by mental causes, and that arrest of those functions precedes the sexual irregularities or the onset of disease in the generative organs. If we ask what are the affections of women that are more frequently present in the mentally afflicted, they are :—

Amenorrhœa.	Stenosis of the uterine canal.
Dysmenorrhœa.	Retroflexion.
Ovaritis.	Tumours of the uterus.
Diseased state of the adnexa.	

I have recently had two patients, sisters, both of whom developed

* See chapter on uterine reflexes for the various visceral neuroses associated with disorders of the pelvic viscera.

symptoms of insanity. In one it assumed the form of dislike to the parents and delusions regarding them, as well as a suicidal tendency. This first attack occurred with suppression of the catamenia. She got quite well of this. With a second stoppage of the periods she became the victim of religious delusions. Again, with the re-establishment of the catamenia, she has perfectly recovered. The other sister with the onset of each menstrual period grew excitable, and incoherent, and took sudden violent dislikes even of her parents. This mental derangement passed off about a week after the termination of her rather scanty flow. Gradually approaching the next epoch it recurred. She is now perfectly well, and her uterine functions are healthy.*

In the discussion on this subject in the Gynæcological Society of Great Britain (October, 1890), there appeared to be an agreement with the view of Savage, that 'a relatively small amount of success followed examination of the pelvic organs in women.' Hack Tuke recognized the coincidence of disordered menstruation and disturbance of the mental functions, and *vice versâ*. He referred to the negative results which followed interference in American asylums; the net 'results of several years' experience were extremely meagre.' Tuke entered specially into the question of oöphorectomy, and indicated that there might be cases in which its performance would be justifiable. Percy Smith, of Bethlehem Hospital, thought that amenorrhœa was only a symptom of the general disorder in acute insanity. He generally deprecated interference with the uterus or appendages, an opinion coincided in by Lankford of Virginia. Wilks advocated, in these cases of nervous disturbance associated with uterine affection, attention to the general condition rather than to the local one.

Robert Barnes held 'that in cases of nervous derangement, in which disorder of the sexual functions is suspected, a close investigation of the state of the sexual organs should be made.' The experience of Lawson Tait on the one hand, and Spencer Wells and Keith on the other, were conflicting as to the possibility or probability of oöphorectomy predisposing to insanity. Tait had no case of insanity in his practice; on the contrary, he had relieved patients suffering from mental alienation by operation; Spencer Wells had had two cases arising after ovariotomy, and he had seen patients almost melancholic after removal of the ovaries; Savage of Birmingham had collected records of four cases of insanity out of 483 cases of removal of the appendages

* Clouston well sums up the class of symptoms we meet with in patients of this stamp. I may summarize them as follows:—Stupidity and lethargy in some, lack of interest in duty, an anti-social tendency, causeless aversion to relatives, intolerance of control, incompatibility of temper, impracticable visionary scheming and want of common sense, sudden development of unaccountable immorality, or perverted sexual and reproductive trains of thought. Unfortunately, as the writer says, 'such patients, who really require to be placed in the hands of a doctor, too often find their way into the arms of a policeman.'

of both sides; and Keith, out of sixty-four hysterectomies with removal of the ovaries, had six cases of insanity. Bantock's experience agreed entirely with that of Tait. He instanced a case in which the connection between ovarian disease and mental disturbance was clear and indisputable, and R. T. Smith quoted a case of cure of hystero-epilepsy by oöphorectomy.

I then expressed the opinion that, while no one could doubt the association existing between certain minor conditions of mental disturbance and disease of the sexual organs, I had only rarely been able to directly trace any relation as of *cause and effect* between true insanity and such disease. I instanced two striking exceptions to this rule—one in which the delusion arose in connection with a fibroid tumour of the uterus, and in the other in consequence of retroflexion of the uterus and enlarged ovaries. Both, however, were examples of what Barnes termed 'an antecedent nervous condition as a predisposing factor.' Savage noticed the occurrence of hallucinations of smell as an early symptom to be looked for in such cases, one instance of which was quoted by the author.

Spencer Wells' opinion may be gathered from these words—

'No one can pique himself upon the outcome of oöphorectomy for mental aberration. A few melancholy girls, worn out by long suffering, and driven to think of the river by disappointment at the abortiveness of doctoring, may have laughed and found life tolerable afterwards, for women are not morally affected by castration as eunuchs. But cure madness—no; gynæcologists will never empty the lunatic asylums. They have sent some women into them.' *

The Medico-legal Relations of Disordered Menstruation.

Macan † quotes Kraft Ebbing as follows :—

'(1) The mental condition of a woman during her menstrual period should be taken into account in medico-legal investigation. (2) That is to say, inquiry should be made as to whether any criminal act committed by a woman has coincided with her menstrual period—and by period should be understood not only the days during which the discharge (flux) takes place, but those also which immediately precede and follow it. (3) The examination of the mental condition is the more necessary—whenever any such coincidence has been once noticed—especially if this should have been preceded by moral or nervous disturbance, or peculiarity in behaviour at the menstrual period. (4) If menstruation have evidently had a distinct influence upon the ideation of the accused, that fact should be admitted as an extenuating circumstance in deciding the punishment even where there is no absolute proof of menstrual insanity. (5) If the crime have been committed during a menstrual period by a woman who, during such period, had been affected by mental

* There can be no doubt that the general belief is that, independently of any collateral effect from the anæsthetic, there is a greater liability to mental disturbance in women after operations on the generative organs than after any other class of operative procedure.

† *Brit. Gyn. Jour.*, May, 1895.

disturbances—and the act be of an impulsive character—the accused should be deemed irresponsible. (6) Accused persons absolved on the ground of menstrual insanity as dangerous, should be submitted to strict surveillance during menstruation, or, preferably, confined in an asylum, where, besides being well looked after, they might perhaps be cured of their mental disturbance.'

Case of Recurring Insanity after Second Uterine Operation.

I last year operated upon a young lady who had been previously confined in an asylum, and who subsequently had the operation of myomectomy performed. The latter step was taken for a fibroma of the uterus, and the adnexa of one side were removed. The discharge from the cervix continuing, and treatment not availing, she consulted me for the affection of the cervix. On examination I found a most unhealthy cervix with a deep and bleeding erosion, and a rather profuse discharge. I removed the cervix, and she recovered perfectly from the operation, but the old symptoms of erotic mania returned, and it became necessary to remove her to an asylum, where she still is.

Some valuable statistics bearing on the entire subject have been collected by Rohé,* extending over four years, in the Maryland Hospital. He is in favour of surgical interference by special permission in every case in which diseased local conditions are shown to be present. According to Rohé, the vaginal examination does no harm.

Napier, commenting on Rohé's deductions, says: 'If it is true that pelvic disease is prevalent among insane women (an assertion easily confirmed or refuted by further observation), the question arises, Has the pelvic disease any etiologic relation to the mental disturbance? Upon this point, much more extended clinical observation is desirable. The mere co-existence of pelvic disease and insanity in women does not establish a causative relationship. The cure of the mental disturbance by removing the physical disease would generally be accepted as a sufficient test. Unfortunately, a cure of the mental derangement does not always follow removal of the local disease. There are abundant reasons for this. The brain organization may have already been so much deteriorated by the persistent reflex irritation from the local disease, that local cure fails to restore the normal brain power. The habit of morbid action of the brain may have been so strongly impressed upon that organ that the original cause of the derangement is no longer necessary to keep it up.' †

Mary Dixon Jones, referring to oöphorectomy for *diseased* ovaries and tubes in the case of women so affected who are insane, or mentally afflicted,

* *Jour. Amer. Med. Ass.*, October, 1895.
† *Brit. Gyn. Jour.*, November, 1895.

having instanced some such cases, says: 'I would not remove healthy or normal ovaries for dysmenorrhœa or any suffering in the regions of the ovaries; I would not remove any save diseased adnexa for epilepsy, nor for mental or neurotic disease, even if I had failed after long trials of tentative measures, and had the cordial, full, and deliberate sanction of experienced practitioners.'

I have said sufficient to show:—

1. That the correlation of insanity and disordered sexual functions arising out of affections of the generative organs is a factor to be taken into serious consideration in the treatment of the mentally afflicted.

2. That where there is ground for the suspicion that some physical condition of the uterus or adnexa exists which may produce or aggravate the mental affection, a careful examination, under an anæsthetic if necessary, should be made.

3. That in the investigation of criminal acts committed by women, either during the menopause or while the menstrual function is either active or suppressed, due weight should be given to the influence exerted by its irregularity or abeyance on the mind of the woman. In doing this, her previous history and temperament should be considered.

4. That the special dangers of the climacteric period should be remembered, and the symptoms indicative of threatening climacteric mania recollected. The principal of these are moroseness and depression of spirits, attacks of hysteria, occasional hallucinations of sight and hearing (especially of smell), delusions with regard to relations, unjust dislikes, unfounded apprehensions of some great crime committed or injury inflicted on them, suicidal tendencies.

5. That in operations on the female generative organs there is a greater predisposition to mental disturbance than after other operative procedures.

6. That women who have been previously insane are predisposed to a relapse by the development of disease in their sexual organs and especially to such recurrence of insanity after operation on these organs.

Under all such conditions, and in the face of these warnings, the greatest supervision and care are required to anticipate the insane impulse, and to prevent suicide or crime, in the case of women who manifest symptoms that are due to a correlation between disorders of the sexual organs and mental instability.

Rohé,* who has made a special study of the effects of operations in

* *Amer. Jour. Obstet.*, March, 1891.

regard to post-operative insanity, considers that there is no more frequent occurrence of insanity after operative interference in women than there is in the case of men. Melancholia, he says, is the least frequent form of mental disturbance following operation, and the removal of the ovaries or the uterus has no greater effect than the amputation of the arm or leg. Confusional insanity may be due to shock, anæsthesia, chemical antiseptics, and toxæmia from septic conditions. This does not include those cases which come under the head of climacteric. Few cases pass into dementia. Rest in bed, easily digested food, judicious administration of stimulant, the use of warm baths, trional suppositories, paraldehyde as an hypnotic, and a regular Weir-Mitchell course, are the most likely means to promote recovery.

The operation *per se*, says Hind, does not cause insanity. The loss of the organs and the predisposition of the neurotic temperament may. Such predisposition should be taken into account in advising operation. Picqué has found as high a proportion of afflictions of the generative organs in women amongst the insane as 88 per cent. He reports most favourably of the effect of operation on the insanity in a fair proportion of those affected. Sherwood Dunn reviews the entire subject and the experience of a number of psychological and gynæcological authorities, and comes to the general conclusion that affections of the pelvic viscera in women are often associated with insanity in the relation of cause and effect; that such lessons predispose to the occurrence of puerperal insanity, that they impede convalescence from mental disorder, and that operative interference should be carried out in those cases in which any pronounced affection of the uterus or adnexa is discovered.

With regard to the precautions that have to be taken during the climacteric, I may mention the case of a lady who was sent to me for a small polypoid tumour of the uterus. She was so morose and abstracted when she saw me in company with her sister that I feared some mental development. I found on inquiry, that for some time past there had been periods of melancholy and depression. She went into a medical home, and I placed a special mental nurse with her. The next morning, when her breakfast was brought to her, the nurse carelessly left the room to lay something just outside the door. When she came back, the patient had cut her throat in two places—fortunately the wounds were not fatal. She became a confirmed lunatic. The small polypus was subsequently removed.

While this chapter is passing through the press, I have had occasion to communicate with several distinguished alienists and gynæcologists on this subject, with the double object of inquiry as

to the influence of menstruation, both normal and abnormal, in the causation of both insanity and epilepsy; and secondly, how far disease of the sexual organs in women is correlated with the symptoms of alienation and the commission of criminal acts. I am, therefore, induced to supplement the foregoing observations by the addition of a few facts bearing on the subject. Fehling's observations on the cure of osteo-malacia by oöphorectomy have also been verified by cases recorded by Mary Dixon Jones. Fehling's idea is, that the osseous affection is due to exalted ovarian functional activity, with consequent reflex effects on the vaso-dilators and constrictors of the medulla, and a consequent reflex tropho-neurosis of the skeleton, having its focus of reflexion in the ovary. According to Fehling, the ovarian secretion produces increased oxidation of organic carbonized bodies, as well as hydrates of carbon and of fats; and, if oöphorectomy be performed, organic phosphorus is retained, and there is an increase in the calcareous salts of the skeleton.*

Arthur Wilcox, of the Warwick County Asylum, has treated cases of insanity by the administration of various animal extracts, one of which was the ovarian. In cases of suppressed menstruation, in which this extract was given, distinct recovery took place from such conditions as melancholia and mania. The same treatment for epilepsy was not so satisfactory.

Jacobs of Brussels has reported similar cases. Mary Dixon Jones has collected a series of cases in which epilepsy was cured by oöphorectomy; and she has also shown how the affection which she has described as gyroma of the ovary was present in several of these instances. All the evidence before me goes to prove that the appearance of the catamenia has, in a large number of the insane, a most important effect on their condition. Clouston regards the ten years from forty to fifty as the ones most favourable for the development of climacteric insanity. He looks upon it as a sub-acute psychosis, melancholia with suicidal impulse being present in 50 per cent. of the cases. He further groups under a separate heading cases of insanity grafted on hysteria, in which there are present a distinct class of symptoms, as incessant talking, sexual or neurotic ideas, craving for notice, with habits of masturbation. He says such cases form 50 per cent. of insane females.

* This secretion may be given in the form of palatinoids. I have elsewhere quoted examples of trophic disturbances of the face and nose undoubtedly brought about by disorder of menstruation.

The insanity of pregnancy is, Clouston considers, comparatively rare, occurring most frequently in women of advanced life who become pregnant, and is usually of a suicidal or melancholic tendency.

Clouston also regards as a separate class what he terms 'ovarian insanity,' or that of old maids, in whom the combined effects of a severely virtuous life, and too absolute a repression of all the manifestations of sex, operate in inducing climacteric insanity. It is true that some leading psychologists deprecate both examinations and operations in the class of case we are dealing with; but reviewing all the gynæcological and psychological evidence and opinions before me, I have no hesitation in saying with Dr. Percy Smith of Bethlem, that, while the gynæcologists must not lose sight of the nervous system, so the alienists must not forget to consider the pelvic organs. Also, that as factors in the causation of insanity, and that state of mentalization which leads up to the evolution of those morbid impulses, both physical and mental, manifested by the committal of criminal acts, disorders of sexual function and diseases of the sexual organs in women play an important part. As a necessary deduction from this belief, it follows that, with certain restrictions, that will be indicated by the individual case, a gynæcological examination may be called for.

A most valuable paper on this subject, on 'Insanity with Sexual Complications,' has been written by Claye Shaw. He rightly dwells on the dual nature of sexual delusions—those that are purely mental, without relation to the sexual organs, and those which have their origin in the latter. He also points out how dangerous, even though there be a correlation between insanity and the sexual centres of the cord, it may be at certain times to excite further reflex activity and stimulate those centres. There may be, he says, uterine or ovarian disease without insanity; or a sexual form of insanity without disease of the genitalia; or, thirdly, insanity may exist, and no sexual delusions. The great difficulty lies in establishing the cause or effect of sexual disorder and the insanity. It is clear that the mere fact of sexual acts or delusions being present is totally insufficient to do this, and the whole of Claye Shaw's arguments go to prove how difficult, if not well-nigh impossible, it is to establish such casual relationship. Referring to a case in which there were recurrent exacerbations of insanity during the catamenia, the patient being rational on most subjects in the intervals, though of an erotic nature, he says: 'I think that the operation

of oöphorectomy would have much relieved her symptoms, at any rate the violent ones, but of this I could not be sufficiently sure to be able to recommend it. . . . In an acute stage of violent insanity, anything like a serious operation is out of the question; and there is always the probability of acute symptoms coming on after an operation, preventing the rest which is so indispensable. I think that this is just such a case in which an examination in the middle of the interval might be justifiable, and if diseased adnexa were found, oöphorectomy might be performed, not otherwise. Seeing the mass of intellectually sound women who suffer from disease of the sexual organs, I think Claye Shaw's conclusion, that sexual or uterine and ovarian insanity is by no means common, is a correct one; but, on the other hand, this does not invalidate the soundness of the proposition that a differential diagnosis of insanity in women, and the presence of disease of their sexual organs, has to be carefully considered as a primal or sustaining cause of the mental condition.

The expediency or justification for the examination of any insane woman will depend upon the answer to the question, not whether her insanity be sexual or otherwise, but if the assertion be true that the primary cause of the alienation may rest in a pelvic disorder, which it is the duty of those who have her in charge to discover. Claye Shaw speaks highly of the effect of wet cupping over the loins in cases of epileptiform insanity at the time of the catamenia. This has the great advantage of directing the attention of the patient away from, instead of to, her sexual organs.

Picqué found a proportion of 88 per cent. of gynæcological affections among the insane, and others have found them in even higher proportion than this. He arranged his statistics from sixty-six cases, according as the disease of the brain developed contemporaneously with that of the womb, those with serious genital affections, where operation had but a comparative success, and those whom operation benefited, hastening their recovery. There was definite cure in eleven cases.

Halliday Croom has this year reported a case of acute mania occurring on the third day after simple ovariotomy, the patient dying on the sixth day, and also a second case of acute mania at each menstrual period, which he treated several years since by the removal of cystic ovaries, resulting in a permanent cure.

Elzholz, of Vienna, has reported a case of suicidal melancholia completely cured by pan-hysterectomy. In this case there was a bleeding myoma.*

---

* *Vienna Klin. Wochenschrift*, November 29, 1898. See additional cases in appendix.

CHAPTER XXXV.

OVARIAN CYSTOMA.

Ætiology, Pathology, and Diagnosis.

B. Cysts:—
1. Oöphoronic cysts.
   a. Simple cysts.
   b. Adenomata.
   c. Dermoids.
2. Paroöphoronic cysts.
3. Parovarian cysts.
4. Gartnerian cysts.
5. Tubo-ovarian cysts.

B. *Cysts.* 1. *Oophoronic Cysts.*

a. Simple cysts.—These are due to distension of the Graafian follicles of the ovary. Occasionally a single follicle enlarges, and may attain a considerable size, but usually these cysts are multilocular; a true unilocular cyst, when large, is much more often paroöphoronic or parovarian. The 'cystic ovary' so often found in connection with chronic ovaritis is an example of a simple multilocular cyst in an early stage of development. When the cysts are still small, they are lined with a single layer of cubical or columnar epithelium, which may be ciliated; in medium-sized cysts the epithelium may be stratified; but in the largest cysts it is usually impossible to demonstrate any epithelium, for this becomes flattened and finally obliterated by the increasing intra-cystic pressure. The walls then appear to be composed only of fibrous tissue; this is at first dense, but as expansion proceeds it becomes progressively thinner, until the wall may give way under even gentle manipulation.

In some cases a single cyst the size of a walnut is found to

contain blood, or a blood-stained fluid; the generally accepted view is that this is due to hæmorrhage into a Graäfian follicle which has become converted, without rupture, into a corpus luteum, for the thick wall is lined by the yellow and plicated membrane characteristic of the corpus luteum. The condition was formerly known as apoplexy of ovary. Alban Doran has, however, shown that true ovarian apoplexy consists of a hæmorrhage into the ovarian stroma through rupture of a follicle, and the term is now properly restricted to this accident.

b. Adenomata.—As the name implies, the characteristic of these cysts is the presence of glandular elements; from this it follows, firstly, that these tumours are often semi-solid; and secondly, that

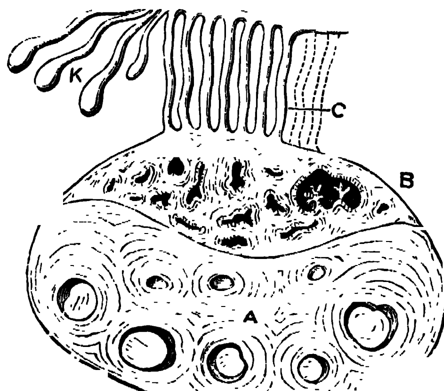


Fig. 512.—A Diagram representing what may be called the Cyst Regions of the Human Ovary. A, Oöphoron; B, Paroöphoron; C, Parovarium, with K, Kobelt's Tubes, and G, Gartner's Duct. (Bland-Sutton.)

as the glands are of the mucous type, the contents are usually viscid, consisting largely of mucin. But it is a very curious feature of these adenomata, that in the different loculi several different kinds of contents may be present: in one the typical clear viscid mucus, in another a clear limpid fluid; in a third a chocolate-coloured fluid, due to admixture of blood. The epithelium lining the loculi is usually of the tall columnar type, well represented in microscopic section in Fig. 514; the regularity of the cells gives them an appearance which has been likened to a palisade. Sometimes a large loculus is seen to be surrounded by several small ones; these may be congregated to one side of the main loculus, suggesting the 'signet-ring' type found in the Graäfian follicle. In other cases

several loculi may communicate together, and this may occur to such an extent that the cyst appears to be unilocular; but even in these cases small loculi may always be detected round the periphery of the main cavity.

The characters of the mucous membrane in these tumours are often very pronounced, and Bland-Sutton contends with much reason that they should be classed with the dermoids; in support of this view, he has found in several



FIG. 513.—PORTION OF A MULTILOCULAR OVARIAN CYST—ADENOMA—SHOWING THE VARIETIES OF LOCULI: *c*, primary, *d*, secondary. (Bland-Sutton.)

instances that whereas in some loculi the characters are those of mucous membrane, in others structures are found which are universally admitted as characteristic of dermoids, viz. hair, teeth, cartilage, sebaceous glands, etc.

In some adenomata papillomatous growths are found; they are usually intra-cystic, and there is reason to believe that they owe their origin in some instances, at least, to the fact that the paroöphoron is involved in the growth This may be regarded as

the explanation more especially of papillomatous masses arising from the deeper parts of the growth and invading the broad ligament. In rare cases the papillomata are found on the surface of the tumour, and these have been described as 'surface papilloma.' In all probability these growths have been in every case originally intra-cystic, the wall of the cyst having thinned out to such an extent that it has given way. Surface papillomata are always associated with hydroperitoneum, and the papillomata show a great tendency to secondary deposition on other portions of the peritoneum, sometimes far distant from the original growth. Adenomata associated with papillomata are frequently bilateral (Fig. 513).



FIG. 514.—MAGNIFIED SECTION OF AN OVARIAN CYST, CONTAINING MUCOUS MEMBRANE AND MUCOUS GLANDS. (Bland-Sutton.)

As a rule, adenomata belong to the benign type of tumours, but not infrequently, and, especially when they are bilateral, they present malignant features, notably in the form of secondary growths, which may attack the rectum, large or small intestine, stomach, duodenum, omentum, or mesentery. The mortality after operations for malignant adenomata is very great, and is often due to the presence of the secondary deposits, which may have given rise to no characteristic symptoms, so that their existence is not suspected until the abdomen is opened. Sometimes, however,

suspicion is aroused by the co-existence of hydro-peritoneum. When this is found associated with hydrothorax, the ovarian tumour may with certainty be diagnosed as malignant, and operative interference is contra-indicated.

c. Dermoids.—Cystic tumours are found arising from the oöphoron and containing structures characteristic of mucous membrane or of the skin and its derivatives. These are called dermoids; and, as the name implies, only those tumours containing cutaneous structures were originally included in this group. But, as we have previously stated, Bland-Sutton maintains that the term ought to be extended to cysts containing mucous membranes, since the two kinds are

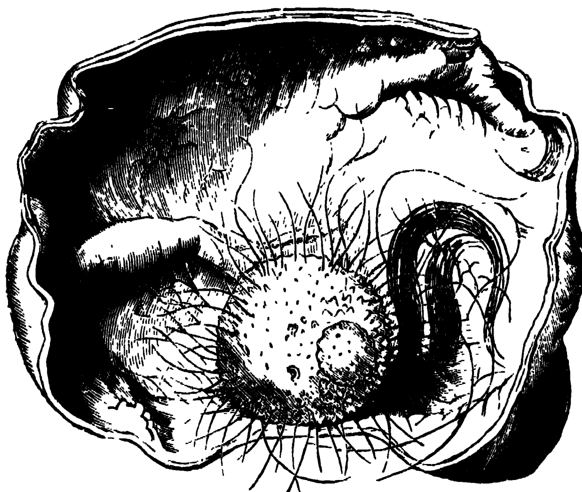


FIG. 515.—AN OVARIAN DERMOID WITH A SPURIOUS MAMMA AND NIPPLE GROWING FROM ITS WALL. (Museum, Royal College of Surgeons—Bland-Sutton.)

often found in the same specimen. The differences in what writers understand by dermoids account for the varying statements as to their frequency. Thus, Olshausen gives their frequency as 3·5 of ovarian tumour; Sutton, on the other hand, states that 'a very large proportion of oöphoronic cysts contain skin or mucous membrane, or both these structures.' Several kinds of dermoids are found; some are unilocular, others bilocular, the two portions having apparently arisen independently, whilst a third kind is found in which one or more loculi of a multilocular cyst have dermoid contents, the rest presenting the usual characters of ovarian adenomata. In dermoids of the mucous membrane type tubular or racemose mucous glands may be demonstrated on microscopic

examination; and these cysts are of course filled with mucin. In the other, and perhaps even more remarkable, dermoids we find such things as hair, bone, cartilage, teeth, horn, nails, and mammary glands. The hair is generally of the same colour as that of the woman's head; it may attain a great length, and in dermoids of old standing it is often found shed and rolled up in a ball in the interior of the cyst. Teeth may be present in enormous numbers, and different shapes; molars, incisors, and canines may be represented. A mammary gland is sometimes adorned with a rudimentary nipple; but the substance of the 'gland' is made up of fat, not of gland tissue. On microscopic examination of the wall of a dermoid we find the histological characters of true skin, including sebaceous and sweat glands: non-striped muscle and nerve tissue have also been described. Besides the various structures we have enumerated, the contents of a dermoid usually consist of a mixture of shed epithelium, loose hair, and fat derived from the sebaceous glands; the whole forming a pultaceous mass. The dermoid contents sometimes become broken up and rolled into a great number of little balls, the size of a pea; these have been called epithelial pills, and consist of epithelium fat; the nucleus may consist of one or more hairs. In a case reported by Walter, 4000 of these little balls were found. Dermoids are sometimes bilateral.

It is a curious fact that among ovarian tumours complicating pregnancy, a large proportion of the reported cases have been dermoids; and the complication is a serious one, because, apart from the mechanical difficulties which may arise during parturition, there is a considerable danger of septicæmia, owing to the tendency of dermoids to suppurate. At the same time, it must be pointed out that in some cases the greenish or yellowish contents of a non-suppurating dermoid have been mistaken for pus. Even when there is no question of pus, the contents of a dermoid are apt to be very irritating to the peritoneum, if they escape into the peritoneal cavity owing to the rupture of a cyst during extraction; this accident should therefore always be avoided if possible, and the tumour extracted whole.

A well-formed heart, with mitral valve, half the tongue, a hand, the jaw-bone, the trachea, and the eye, have been found in dermoids (Johnstone, Cincinnati). Johnstone contends that—

'The ovarian dermoid is a true parthenogenesis, that is, "that the ovum itself is at fault, and that, instead of losing one of its polar cells, it retains the

male element from some pathological reason and goes on in a weak way in an effort to form the human body." If dermoids were a doubling-in of the mother's own membranes we should expect to find them in the hilum of the ovary. Such a thing is almost unheard of, and therefore they are not the remnants of the mother's own fœtal life. The same pathological process that starts the hypertrophy of the ovary which results in ovarian tumours, catching many of the follicles in different grades of development, finds some of the ova contained in these follicles that have not lost the polar cell and are still adherent to the Graäfian follicle. This hypertrophic growth arrests the development of the ovum, holds it fast to the cyst-wall, and does not allow the little cell to follow out its physiological law and get rid of one element. This being retained and receiving food and nourishment, in an irregular way attempts to follow out its own natural history, and a dermoid is the result.'

Dermoid Cysts of the Broad Ligaments.

These cysts are quite independent of the ovaries; they form a distinct variety. They are very rare, only some ten cases having as yet been recorded. Their pathology is allied to that of those of the ovary; their diagnosis is most difficult. They evolve more slowly, they cause more pain, and are more sensitive to manipulation than the ovarian.*

Retro-rectal Cysts have been met with in some few cases. They occur either above or below the levator ani, between the rectum and coccyx, or in the subserous tissue between Douglas' pouch and the levator. Those in front of the rectum are apt to be mistaken for other tumours in the pouch. They must be removed by an incision at the side of the sacrum or perineotomy, according to the situation of the cyst.†

Cancer arising in a Dermoid Cyst of the Ovary.

Clark, of Johns Hopkins Hospital, has recorded a case of a combined cystic and solid tumour of the left ovary. The cyst had the characteristic epidermal appearance, and there was a growth of short black hair. No teeth, bone, or cartilaginous structures were found, but on microscopic examination of sections taken at the junction of the cyst-wall with the tumour, cancerous epithelial degeneration and projections were seen, while the centre of the tumour was almost entirely composed of cancerous structure.

2. *Paroöphoronic cysts.*—These are developed in the hilum of the

* Bertholet, *British Gynæcological Journal*, 1899.
† *Arch. f. Klin. Chirurgie*, Bd. lvii., H. 1.

ovary, and while they are still small, they can be distinguished from the previous varieties by the fact that the cortex of the ovary can be recognized more or less unaltered on the surface of the cyst. They are distinguished from parovarian cysts (to be next described), by the fact that the ovary is involved. When they attain a considerable size, the ovarian tissue may be very hard to recognize; but they are easily differentiated from oöphoronic cysts by the following characters; they burrow deeply into the broad ligament, are unilocular, and their walls are frequently lined by papillomatous masses. When no papillomata are present, it may not be possible to say whether the cyst owes its origin to the paroöphoron or to the par-

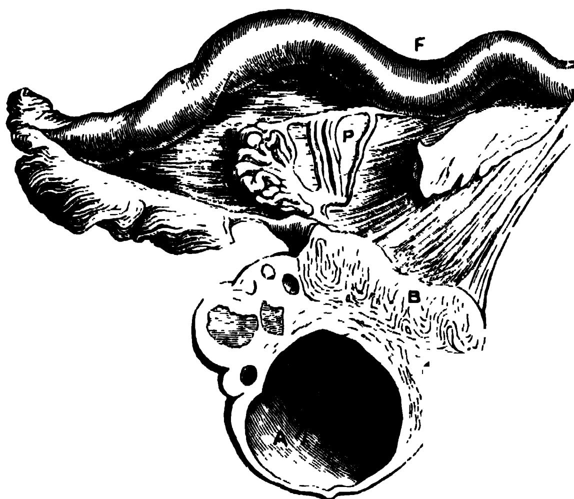


FIG. 516.—AN INCIPIENT OOPHORONIC CYST. A, Oöphoron; B, Paroöphoron; P, Parovarium; F, Fallopian Tube. (Bland-Sutton.)

ovarium; but the presumption will be in favour of the latter. The walls of paroöphoronic cysts are lined by a single layer of columnar epithelium, and are often thin; consequently they easily rupture, exposing the papillomatous masses (Fig. 517). This is always followed by abundant hydro-peritoneum, and the warty growths show a great tendency to be detached and transplanted to distant parts of the peritoneum, where they become the starting-point of fresh growths. There is, however, no tendency to recurrence after removal, and with the evacuation of the fluid from the peritoneal cavity the secondary warts disappear from the peritoneum. Paroöphoronic cysts are frequently bilateral.

The papillomata are usually very vascular, and free hæmorrhage may occur during the manipulations incidental to their removal.

3. *Parovarian cysts.*—These are due to distension of the vertical tubes representing the remains of the mesonephric tubes known as broad ligament cysts. As they grow they distend the layers of the meso-salpinx, and the Fallopian tube is found, often elongated, lying across the summit of the cyst (Fig. 518). The ovary of the same side can generally be distinguished as distinct from the tumour. In the case of very large cysts, the ovary may be so flattened as to be almost unrecognizable except on microscopic section. Parovarian cysts are found of all sizes; small cysts the size of a pea may be discovered accidentally, when the abdomen is opened for other reasons; but cysts which are operated upon mostly vary in size between a large orange and a cocoa-nut. The smaller cysts are lined with ciliated columnar epithelium; as the tumour enlarges, the epithelium first becomes stratified, and then atrophies. The walls are thin and translucent; the contents consist of a clear limpid fluid, which throws down a flaky precipitate with alcohol. Papillomatous masses are never found in their interior, and this serves to distinguish them from the paroöphoronic cysts previously described. They are always unilocular. They occur most frequently between the ages of twenty and forty.



Fig. 517.—Papilloma of the Ovary. Half of Tumour. Springing from its outer surface are papillary masses Internally it is composed of one large and six smaller cysts. Projecting from the inner surface of these are papillary masses. The large cyst *c* contains a tenacious fluid which was coagulated by the Müller's fluid. *a* is a cross-section of the Fallopian tube. (Two-thirds natural size.) (Cullen.)

4. *Gartnerian cysts.*—In fœtal life, the mesonephric, or Wolffian duct passes from the mesonephros (parovarium of the female) to the base of the bladder. As development proceeds, this duct becomes obliterated, leaving only the vestige known as Gartner's duct. In some mammals, such as the cow, these ducts normally remain patent; and in the adult female portions of the duct may

escape obliteration, and become distended with a clear fluid. Such cysts may consequently be found anywhere along the original course of the duct, that is, in the broad ligament below the ovary, by the



FIG. 518.—A CYST OF THE PAROVARIUM, SHOWING ITS RELATION TO OVARY AND TUBE. A, Oöphoron; B, Paroöphoron; F, Fallopian Tube. (Bland-Sutton.)

side of the uterus, or along the lateral wall of the vagina.* They are seldom larger than a hen's egg, but occasionally they may attain much greater dimensions.



FIG. 519.—PAROVARIAN CYST SITUATED BETWEEN THE AMPULLA OF THE TUBE AND THE OUTER END OF THE OVARY. (Howard Kelly.)

5. *Tubo-ovarian cysts.* This name is given to a condition in which the lumen of the Fallopian tube communicates directly with the interior of an ovarian cyst. Two varieties must be distinguished;

* See chapter on the Vagina.

the first is due to inflammatory changes, and probably first appears in most instances as a tubo-ovarian abscess, the contents of which then become sterile, in much the same way as a hydrosalpinx arises from a pyo-salpinx. It is doubtful whether a tubo-ovarian cyst ever arises simply from the communication of a tube with an ovarian cyst without any process of suppuration. A tubo-ovarian cyst presents a characteristic retort-shaped mass; the aperture of communication is generally wide, and is seen on section to be surrounded by the tubal fimbriæ. The second variety is of congenital origin, and is not a true tubo-ovarian cyst, but the condition described by Sutton as an ovarian hydrocele. In this case the tube communicates, not with the interior of the ovary, but with a peritoneal pouch which surrounds the ovary like the tunica vaginalis round the testis. If the mouth of the peritoneal recess in which such an ovary lies becomes occluded by adhesions, the pseudo-tubo-ovarian cyst results. The wall of the cyst is not here formed by a cystic ovary, but this gland is found lying up against the inside of one portion of the cyst-wall. It is better to use the term ovarian hydrocele for this condition, restricting the term tubo-ovarian cyst to the variety of inflammatory origin. It is generally impossible to tell from external appearances alone with which kind of cyst we have to deal; this can only be determined on opening it. A third condition whose external appearance resembles a tubo-ovarian cyst is also found; namely, a large hydro-salpinx matted to the ovary by adhesions here. Careful separation of the adhesions will shew that the ovary is quite distinct from the tube.

CHAPTER XXXVI.

OVARIAN CYSTOMA—DIAGNOSIS AND TREATMENT.

THAT surgeon has the least chance of committing an error in his diagnosis of an abdominal tumour who commences his examination of the case by recollecting the many possible and likely sources of error which he has to avoid. Gaillard Thomas has carefully collated a list of forty-three diseased conditions which may be mistaken for ovarian cystoma. It must also be remembered that it is not in the well-marked case of ovarian cystic disease that the careful surgeon is apt to fall into error. Rather is it when he is confronted by a case in which some obscure and unfamiliar signs are present, and when the history of the growth of the tumour is not clear, or that evident complications exist, such, for example, as pregnancy, great obesity, ascites, cystic degeneration of any of the abdominal viscera. But, independently of the nature of the tumour, there are other points which he has to decide, and which are of vital moment to the woman. Such are, its benign or malignant character, the presence of adhesions, the amount of solid matter present and its position, the general constitutional state of the patient, and the evidence of any grave affection of the lungs, heart, kidney, liver, spleen, bowel, or uterus, which may complicate the operation of ovariotomy, and contra-indicate its performance. Overweening self-confidence will nowhere more startingly meet the rebuff it merits than in the case of over-confident diagnosis of abdominal tumours.

It may be well to enumerate those conditions which we are liable to confound with ovarian cystic disease :

Great obesity.
Hysterical tympanites and phantom tumour (pseudocyesis).
Fæcal tumour.
Dilation of the stomach.
Distended bladder.
Hydrometra.
Hæmatometra.
Pyometra.
Physometra.
Hydro-salpinx.
Ascites.

Encysted dropsy.
Hæmatocele.
Cystic disease of the parovarium.
„ „ kidney.
„ „ spleen.
„ „ liver.
„ „ uterus.
Uterine fibromyoma.
Enlargements and displacements of the liver, spleen, and kidney.
Hydronephrosis and pyonephrosis.
Disease of the abdominal glands.
Omental tumour.
Pregnancy.
Extra-uterine fœtation.
Hydramnios.
Death of fœtus.
Pelvic abscess.
Hydatid mole.
Accumulation of pus or serum in the peritoneal cavity.
Malignant disease of the uterus.
„ „ „ peritoneum.
Extra-peritoneal cysts (Tait).
Mesenteric lipoma, or chyle cyst.

Nearly all these conditions I have myself known, at one time or another, mistaken for ovarian tumour.

Examination of a Suspected Case of Ovarian Cystoma.

The directions given (pp. 87–112) as to the steps which must be followed in completing a diagnosis, and the appliances necessary to conduct such examination, should be referred to. I shall here classify the positive and negative signs on which we rely in arriving at a diagnosis. Before doing so, it may be well to refer to the most important facts in the history of an ovarian growth which assist in diagnosis.



Fig. 520.—Ovarian Tumour compressing Thorax. (Sir Spencer Wells.)

History and Early Symptoms.—The tumour has usually commenced at one side, and has at first caused but little distress. This, however, is by no means an absolute rule. There may be dysmenorrhœa, pelvic and reflex pains, and while the tumour is still pelvic,

irritability of the bladder and rectum. Hæmorrhoids may form from pressure. All these early symptoms are aggravated if the cyst-wall contract adhesions, and if the tumour be prevented from rising into the abdominal cavity. The general health is at first but little interfered with. There is no œdema of the upper or lower extremities. There is not much to rely on with regard to the menstrual periods, and menstruation may not be interrupted. Occasionally there is even menorrhagia; or, on the other hand, the flow may become in the first instance scanty, and finally cease. The breasts may slightly enlarge, and the characteristic appearances of



FIG. 521.—OVARIAN CYSTOMA. (Bright.)

early pregnancy (with the exception of the secretion of milk) may be present.

Prolonged lactation has to be remembered. I have had a patient under my care who miscarried six years before I saw her. The breasts still secreted milk, and the flow was increased at the menstrual advent.

Obscure peritoneal pains are sometimes complained of—the result of distension or stretching of the peritoneum, or twisting of the pedicle. Nausea and vomiting occasionally accompany such pains.

The growth may still be distinctly asymmetrical after the tumour rises above the pelvis, but gradually it assumes a central position. There is not any regularity in the rate of growth. Some tumours may increase very slowly, or remain quiescent for a time; others develop with extraordinary rapidity, each week producing a marked change in the shape and size of the abdomen. The growth may now be attended with abdominal tenderness in parts, or peritoneal pain, while the pelvic symptoms are relieved. The countenance

gradually begins to change. Confinement, anxiety, suffering, emaciation, tell in the expression of the face.

Wells graphically describes the 'facies ovariana' of a patient:

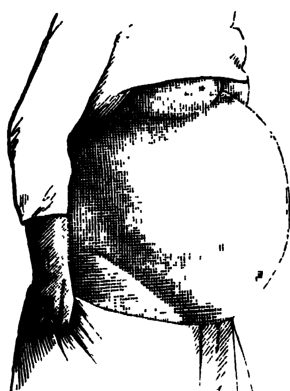


FIG. 522.—LARGE POLYCYSTIC OVARIAN TUMOUR, IN AN EXCESSIVELY FAT PATIENT. The great distension of the upper abdominal zone is evident and characteristic of the obese.

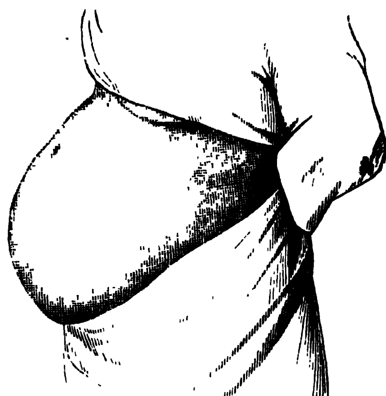


FIG. 523.—A PAUNCHED ABDOMEN CONTAINING NEITHER FLUID NOR TUMOUR, BUT CLOSELY RESEMBLING AN OVARIAN CYST.

'The emaciation, the prominent, almost uncovered bones, the expression of anxiety and suffering, the furrowed forehead, the sunken



FIG. 524.—VERTICAL OUTLINES OF A MYOMATOUS UTERUS.

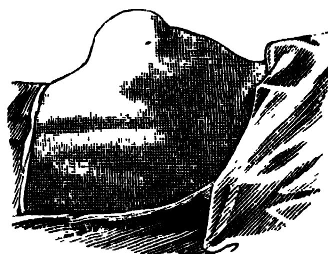


FIG. 525.—NODULAR OUTLINES OF A LARGE FIBROCYSTIC TUMOUR.

OUTLINE DRAWINGS OF ABDOMINAL ENLARGEMENTS FROM PHOTOGRAPHS BY HOWARD KELLY.

eyes, the open, sharply defined nostrils, the long, compressed lips, the depressed angles of the mouth, and the deep wrinkles curving

round these angles, form a face which is strikingly characteristic.'* Should relief not come by operative means, the abdominal distension increases, the superficial veins may become enlarged, lineæ albicantes appear, constitutional symptoms, both thoracic and abdominal, being aggravated by the increasing pressure, and the patient finally sinks from the combined effects of emaciation and organic disease induced in the heart, lungs, stomach, or kidneys.

Hydramnios.—It is important to remember the chance of the surgeon mistaking hydramnios for ovarian cystoma. The difficulty in diagnosis consists in the absence of some of the signs of pregnancy in the instance of hydramnios.

The following is a case in point:—

Several years since I went prepared to tap a case in which most urgent symptoms of dyspnœa and lung complication threatened life. I decided, after most careful examination, that there was an enormous collection of ascitic fluid. There was albumen in the urine, and great œdema of the lower extremities. Before finally puncturing the abdominal wall, I passed the uterine sound, and discovered the enlarged uterus. There was an escape of an enormous quantity of amniotic fluid. The patient was delivered within twenty-four hours of a healthy child.

Ovarian Cysto-Sarcoma Ascites.—In the case of a multilocular cysto-sarcomatous tumour, removed by me from a girl aged twenty, the diagnosis was obscured by the presence of a large quantity of ascitic fluid, which distended the abdomen. It was found on removal of this tumour that a few of the superficial cysts had ruptured, and this explained the ascites, which could not be accounted for before operation, all the viscera being healthy. She had been twice tapped. On drawing off some of the fluid prior to operation for the purpose of diagnosis, it was discovered to contain some slight traces of paralbumen, and yet it did not spontaneously coagulate, as ascitic fluid would. A few of Drysdale's granular cells were found in different portions of the fluid examined. The operation proved the fluid to be in greater part ascitic, the few cysts which had burst on the surface of the cystoma not being larger in size than a hen's egg.

The liability to err in the presence of a quantity of ascitic fluid was well illustrated by a case recorded by Walter. There had been a suspicion of pregnancy in consequence of coitus and suppression of catamenia. But there were no signs of pregnancy, and hard, irregular masses were felt in the umbilical region. The presence of these masses, together with rapid enlargement of the abdomen, and no symptoms of tubercular disease, pointed to some malignant condition difficult to determine. A multilocular cystoma was discovered, which had ruptured and caused the ascitic accumulation.

* Ovarian tumours are not now permitted to assume such a size as to bring about so striking physical changes as those described by Wells; the 'facies ovariana' is therefore not so often seen.

To illustrate the difficulty of diagnosis in some cases of cystic tumour of the ovary, I may cite the following cases :—

Large Semi-solid Cysto-Sarcoma of the Ovary.

In 1890 I was consulted by a widow lady for a large tumour which had been diagnosed as a fibroid of the uterus. The mass had a very solid feeling on palpation, and fluctuation was with difficulty detected. The tumour, on careful examination, was believed to be distinct from the uterus, the cavity of which did not exceed three inches in length. It appeared, however, to fill the right hypochondrium, the epigastrium, and the left hypochondrium. In these regions, and above the level of the umbilicus, it was distinctly solid. It was most



FIG. 526.—SOLID MULTILOCULAR OVARIAN CYSTO-SARCOMA, ABOUT A QUARTER THE NATURAL SIZE. One side of the cyst as inverted, X—X, marks the solid portion of the growth. The tumour proved to be of a sarcomatous nature—size 14 inches × 10. (Author.)

difficult to isolate it from the liver and spleen. Heywood Smith examined the case with me. We arrived at the conclusion that the tumour was a multilocular ovarian, and that it was in great part solid. How far it was adherent, or to what extent the adjacent viscera were involved, it was not possible to say. Operation proved that the diagnosis was correct. The parietal peritoneal adhesions were easily detached, but great difficulty was experienced in removing the tumour. It was impossible to get it through a rather extensive incision. I emptied all the cysts I could with the trocar. About nine pints of liquid were drawn off without apparently diminishing much the bulk of the tumour. I now enlarged the incision in the cyst-wall, and, grasping the inside of the cyst with my hand, withdrew it (by inverting it) through the

abdominal incision. Fig. 526 was drawn from the tumour; the stitched margin shows the opening which admitted the hand, and a curved line drawn from X—X marks the solid portion of the tumour. The patient made a rapid and perfect recovery.

Impacted Ovarian Cyst.

Tenison Collins removed an ovarian cyst under the following conditions. The patient was suffering from periodical menorrhagia. 'She was very stout and anæmic. A tumour was felt distinctly above the pubes, fixed and immovable, and dull on percussion. The flanks were resonant. *Per vaginam*, the anterior lip of the cervix was hard, and the os patulous; bimanually, in front of the uterus was a hard, rounded, globular mass, apparently immovable, with no fluctuation. The sound passed three and a half inches, and caused hæmorrhage; somewhat limited mobility of the uterus was transmitted to the tumour; Douglas' pouch was occupied by a movable enlarged ovary. The sound in the bladder passed to the left of the mass, which was felt separate from, above, and to the right of, the bladder.

'The long duration of the case, the severe menorrhagia, the apparently solid character and immobility of the tumour, the increased length of the uterus, and the compression symptoms, led him to confirm the diagnosis of myoma. Removal of the appendages, or, if demanded after exploration, hysterectomy, was advised. On operation the tumour proved to be a small, tense, impacted ovarian cyst.'

CASE OF CARCINOMA OF THE OVARY.

Case I.—Large Solid Scirrhus Carcinoma of One Ovary and Fibro-adenomatous Growth of the Other — Patient supposed to be Pregnant—Extreme Emaciation—Operation—Recovery.

Mrs. C., aged forty-two, five children; last labour September, 1894; last catamenial period April, 1897; widow since November, 1897; last marital act September, 1897. I learned that pregnancy was suspected, and an anomalous gestation surmised; there had been occasional attacks of diarrhœa and some sickness for the past six months.

I saw the patient on May 28, 1898. She was greatly emaciated and very weak. The abdomen presented the shape and character generally seen with ovarian cystoma. The abdomen was the size of the eighth month of pregnancy. The skin was tightly stretched over a large solid mass, in parts of stony hardness; this was movable, and appeared lobulated, while a sulcus to the left side seemed to divide it from a second mass occupying the left inguinal region.

PLATE XXV.



Scirrhus Carcinoma of the Ovary. Reduced to $\frac{1}{3}$ nat. size. 12 inches in length by 27 in circumference.

PLATE XXIV.



Adeno-Fibroma of the Ovary. Removed from the same patient as the Scirrhus Carcinoma. Reduced to $\frac{2}{3}$ nat. size. [To face p. 704.

PLATE XXVI.



LID OVARIAN ADENOMA WITH CYSTOMA, REMOVED IMMEDIATELY AFTER ATTACK OF GENERAL PERITONITIS. Recovery. (Author.)

[*To face p.* 705.

I could disassociate the uterus from the tumour or tumours, the cervix was very hard, and there was an associated movement of the uterus. Bland-Sutton, who saw the tumour before operation, agreed with me that it was malignant.

I operated on May 31st. On opening the abdomen by an incision, which had to extend from a short distance below the ensiform cartilage to the pubes, a small quantity of ascitic fluid escaped. The large mass was easily delivered, and the pedicle secured (Plate XXV.).

The second (left) tumour was then removed, and the pedicle dealt with (Plate XXIV.). The only complication (a serious one for some time) was a return of diarrhœa, which caused considerable trouble, and made the administration of nourishment also difficult. However, the patient left for the seaside one month after operation, greatly improved in health. How emaciated she was before the operation may be judged from the fact that she only weighed 6 st. 5 lbs. before going out from the Home. J. H. Targett reported on both tumours:—

'The large solid tumour of the ovary was a scirrhus carcinoma. The smaller specimen was a solid, pyriform tumour, measuring four inches by two and a half inches. It had a somewhat nodulated exterior. The cut surface showed a rounded gelatinous area in the broader end of the tumour. This area measured two and a half inches in diameter, and was fairly well defined. The rest of the tumour was fibrous and traversed by large thin-walled vessels The gelatinous area is not quite homogeneous in appearance, the peripheral zone being more gelatinous than the rest. The Fallopian tube and mesosalpinx were normal.'

Histologically the tumour closely resembled the tumour shown in Plate XXIV., adeno-fibroma. (This patient died in about five months after the operation, of malignant disease of the omentum.)

OVARIAN CYSTOMA WITH ADENOMA CAUSING PERITONITIS.

Case II.—Solid Ovarian Multilocular Adenoma and Cystoma with Ascites—Ovariotomy after General Peritonitis, resulting in Complete Adhesion of the Parietal Peritoneum with Extensive Bowel Adhesions—Patient believed that she was Pregnant—Recovery.

Mrs. S., aged forty-six, has had four children; last pregnancy in 1894; last catamenial period in 1895 (cannot fix date).

History.—I saw this case with Dr. Disney on May 13, 1898. He was called to see Mrs. S. for the first time on April 21st. She

was complaining of slight pains in the abdomen, and having for the past five months increased greatly in size, believed that she was in labour. He found a tumour inclined towards the left side; there was no fluid then, and the temperature was 99·6°. During the day the pain increased; at 11 p.m. he found a considerable amount of swelling, temperature 102°. Next day there was evident general peritonitis, temperature 104°, and on the 23rd she nearly collapsed. This critical state lasted about four days, temperature between 103° and 105·5°. There was absolute constipation between the 20th and 1st inst. despite many remedies. Then the bowels acted naturally. From the 27th there was gradual improvement, and by May 1st the temperature was 101°, but did not become normal till May 11th. There was a great amount of swelling, and pain on pressure all the time.

Immediate operation was the only step to save life. The patient was then suffering from occasional attacks of pain, and was kept under the influence of morphia. She was in an extremely enfeebled condition, so much so that the question of removal to any Home had to be anxiously considered.

On the 21st I operated. The patient was so feeble that she could not stand, was greatly reduced, and, further, had a very rapid and feeble pulse.

On opening the abdomen ascitic fluid escaped, and the parietal peritoneum was found completely adherent to the large cyst-wall—this was so to its entire extent. It was carefully detached all round before using the trocar, and when the cyst had collapsed the bowel was found in several places adherent in festoons to the posterior surface of its walls; in fact, considerable loops of intestine were attached, and had to be carefully peeled off, the vessels where necessary being ligatured. When the pedicle was secured, and all bleeding arrested, I inserted a drainage-tube. This was removed on the fourth day. The patient went to the seaside on June 15th.

The recent attack of severe general peritonitis, the universal adhesions, and extensive bowel attachments, at the time of the operation, and the importance of rapid operation before these adhesions had become stronger, are the principal points of interest. Had the operation for any time been delayed, its performance would have been impossible.

The specimen J. H. Targett reported 'as a multilocular ovarian cyst consisting chiefly of one large loculus, with imperfect septa.

The whole specimen (after evacuation of the cystic fluid) is about the size of an adult head. The pedicle appears to have been twisted, and the surface of the specimen was universally adherent. The meso-salpinx is plastered to the cyst-wall, but the Fallopian tube in it is normal. The solid portion of this specimen has the structure of a simple multilocular adenoma of the ovary. The smaller spaces are lined with columnar epithelium, and the larger ones are filled with a colloid substance. There is no evidence of malignant disease.'

LARGE OVARIAN CYSTOMA—SAC FULL OF PUS.

Case III.—Large Suppurated Ovarian Cystoma with Extensive Adhesions to the Bowel and Omentum—Ovariotomy—Recovery.

The patient had been confined four weeks before I saw her in consultation. The delivery had been followed within forty-eight hours by an elevation of temperature, and it was noticed that the abdomen was swollen, and appeared to contain fluid. The temperature remained erratic, and varied in range between 102° and 105° until I saw her, when she was undoubtedly very ill. I confirmed the view that we had to deal with a fairly large ovarian cyst, which had probably suppurated, and that immediate operation was called for. Accordingly, I operated within forty-eight hours, Dr. Allen of Stanmore assisting me. The cyst-wall was greatly thickened, closely adherent to the entire parietal peritoneum, which had to be peeled off at both sides, after the cyst had been tapped and syphoned of pus. Most difficult was the approach to a very broad pedicle, adhesions having been formed between the rectum at the left side and the sac and a greatly enlarged Fallopian tube. The pedicle, however, was secured in three portions, and then came the most difficult part of the operation. The sac was firmly adherent posteriorly all over its surface to the bowel; the colon and the mesocolon were plastered to it above, with the omentum, requiring the greatest care in separation, and causing considerable difficulty in the arrest of bleeding. However, the sac was finally removed in its entirety, all bleeding was arrested, the abdominal and pelvic cavities were left perfectly clean, and the operation completed in two and a half hours. The anæsthetic was ether; the patient suffered from no shock, and made a good recovery. The bowel was protected all through as carefully as possible by small napkins of flannelette wrung out of warm sterilized water.

Urachus Cysts.—Lawson Tait first described cases of extra-peritoneal cysts, closely resembling ovarian cysts, detailing the particulars of twelve cases in which these tumours occurred. The cysts appeared in two instances to be developed from the urachus, in another from the Fallopian tube. They were not intra-peritoneal. In fact, in some instances, there appeared to be an absence of the pelvic peritoneum. The cyst-walls were related to the parietes in front, and to the peritoneum posteriorly. The cysts were opened and emptied of their contents, and a drainage-tube inserted; in some cases the cysts were removed, or portions of the cyst-wall.

Physical Signs, Positive and Negative, of an Ovarian Tumour.

Positive Signs.

A tumour at first noticed in either inguinal region, gradually becoming central, the greatest circumferential measurement being below the umbilicus; lateral measurement in the early stages increased from the middle line to the vertebral columns or from the anterior superior spine to the umbilicus of the side affected.

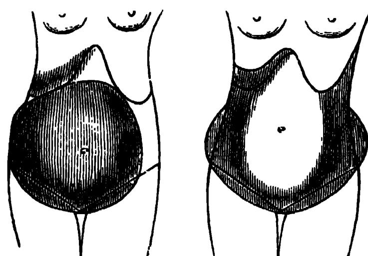


Fig. 527.—Dull Areas in Ovarian Tumour and Ascites. (Barnes.)

Outline of the retained tumour can be defined.

Abdominal integument tense, frequently thinned—otherwise not abnormal.

Later stages: distension of abdominal veins, and lineæ albicantes seen.

Fluctuation limited to the dull area. Wave more distinct, but not so superficial as the ascitic wave.

Dulness on percussion, central: not much affected by change of posture; resonance in the flanks from the intestinal displacement. It must be remembered that the presence of gas in the cyst cavity may lead the practitioner astray by the resonant note it gives to percussion.

Uterus frequently displaced behind the cyst; on vaginal examination the uterus is frequently found drawn up from the examining finger; the cervix may be shortened.

Aortic pulsations (Atlee) are transmitted through the tumour.

The 'facies ovariana' is present.

The fluid drawn by aspiration or paracentesis is usually of an amber colour, but varies in colour and consistence; is viscid and sticky, of specific gravity of 1015 to 1030; contains paralbumen and metalbumen; when examined under the microscope various forms of epithelial cells are seen, mixed with cholesterine particles, and perhaps oil-globules or blood-cells. The characteristic cell described by Drysdale as pathognomonic is a non-nucleated granular cell, on which ether has no effect, and acetic acid only renders the granules more distinct. Exploratory incision (as in the first step of ovariotomy) detects the bluish-white, or glistening and smooth wall of the cyst.

Negative Signs.

The general health does not rapidly deteriorate.

The catamenia are not generally absent, though they may be scanty.

There is seldom menorrhagia.

There is no cardiac, renal, or hepatic disease to explain the dropsy.

Œdema of the extremities is not present (until very late in the disease).

The tumour is not central from the first; it does not proportionately increase from month to month, as in the case of the pregnant uterus; it is not hard and resisting.

The umbilicus is not prominent, bulged out, watery-looking, or thinned.

The integument is not materially altered in appearance or œdematous; the distension of the superficial veins, as a rule, comes on late in the disease.

The cachexia of malignant disease, and of organic disease in the viscera, or of malignant ascites, is absent.

The most important signs of pregnancy are absent, such as:

Milk in the breasts (not necessarily absent, as an ovarian tumour may develop during prolonged lactation);

The fœtal pulsation;

Uterine contractions;

Ballottement (not necessarily absent; a solid tumour may be contained in an enlarged cyst, and give the sense of ballottement on practising this test).

The os uteri is not soft and patulous.

The uterine cavity is not (generally) enlarged.

The uterus does not move with the tumour, nor is the uterus found to be continuous with it (recto-vaginal and utero-abdominal methods).

There is no history of rigors, hectic, great pain, and nightly exacerbation of temperature (unless there has been suppuration of the cyst and peritonitis, as in case, p. 707).

The tumour does not lessen or disappear on the administration of chloroform, nor can any considerable depression be made in it under the influence of the anæsthetic.

It does not diminish perceptibly when the bladder is emptied.

There is no inordinate obesity in other parts of the body.

The fluid is not of very low specific gravity; it is not pure serum; it does not spontaneously coagulate; it does not, when kept, deposit filamentous particles of fibrine. The characteristic fibre cell of Atlee is present.

Paracentesis does not cure the disease.

Exploratory incision does not expose a dark-coloured and vascular tumour.

Diagnosis of Adhesions.

Spencer Wells, in writing of the contra-indications of ovariotomy, said that adhesions to the abdominal wall may be almost disregarded. Though this may be so in the hands of a skilled operator, it is widely different with those about to operate for the first time. The presence of adhesions to the pelvic viscera and intestines must materially influence the chances of a successful operation.

'Adhesions low down in the pelvis,' says the same author, 'are, on the contrary, of great importance. The difficulty is to separate them without serious injury to the rectum, or bladder, or the uterus, or to large blood-vessels, or to nerves. . . . When deep-seated and very intimate, the dissection necessary is out of the question in the living patient, and gives no small trouble in the dead.' To detect adhesions to the abdominal wall, the patient is placed on her back, with the knees raised, opposite a good light, and the abdomen must be entirely uncovered. The proofs that Spencer Wells relied on that the cyst was free of adhesions to the abdominal parietes were as follows: (*a*) Movement of the cyst-wall visible with the acts of respiration (percussion enables us to limit the superior border of the cyst, and prevents our mistaking it for the transverse colon). (*b*) By percussion the dull sound will descend in inspiration, rising again in expiration. (*c*) With the hands placed flatly on the abdominal wall, no crepitus can be felt, which may be present if any adhesive cords of lymph stretch from the cyst to the abdominal wall: audible

crepitus is heard when the lymph-surfaces are recent (the fact that omentum may intervene between the cyst and the abdominal wall is not to be forgotten; with free omentum lying between the cyst-wall and the parietes, crepitus is heard, not so if adhesion exists between the cyst and parietes); its proximity to intestine, and the consequent resonance on percussion, and the softer and doughy feel, help to distinguish it. (*d*) 'The recumbent patient is directed to try and sit up without assisting herself by her hands or elbows. This effort puts the recti on the stretch, and if a tense ovarian cyst is free from adhesion, it falls backwards and to the sides, while the muscles form a projecting ridge in the centre of the abdomen.' Only when the adherent cyst—it may also occur in the case of a small cyst—is 'flaccid or partially empty' is this appearance seen. (*e*) The umbilicus moves with an adherent cyst. (*f*) By placing the woman in the knee-elbow position, and examining the tumour through the vagina, if there are pelvic adhesions it does not yield to digital pressure, and the uterus may be pushed out of position or fixed. A portion of an ovarian cyst may occupy the pelvis and become fixed there, and still no adhesions exist. (*g*) If there have been recurrent attacks of peritonitis, with severe pain and uterine cramp, we may suspect that there are adhesions, or some twisting of the pedicle.

Inflammation and suppuration of the interior of the tumour may be suspected if there be rigors, rapid pulse, diarrhœa, hectic, and elevation of temperature. Such inflammatory action may lead to rupture of the cyst and discharge of its contents into the abdominal cavity, or, as the consequence of adhesions, the cyst may empty itself through a fistulous opening by the abdominal wall, or discharge itself by the vagina, bladder, uterus, or rectum. Death may occur ultimately from pyæmia or exhaustion.

Internal hæmorrhage into the interior of the cyst will be suspected if symptoms of severe shock occur suddenly with collapse.

I have thus very briefly summarized the most important and reliable signs and symptoms by means of which we are enabled to say: (1) that the growth is ovarian; (2) that it is unilocular or multilocular; (3) that it is not malignant; (4) that it is not a cyst of the parovarium; (5) that there are or are not adhesions; (6) that inflammatory changes have not occurred; (7) that internal hæmorrhage is not going on into the cyst.

It is seldom that the careful diagnostician, proceeding step by step in the examination of a case, will fall into error. Keeping clearly in his mind the possible pitfalls always open for hasty conclusions, he must check one test by the application of another, and deliberately balance probabilities. Should he be in doubt between any two decisions, he will carefully apply all the facts of the case to each separately, comparing critically the weight of evidence

which inclines him one way or other. The practitioner has to remember that such conditions as pregnancy, encysted dropsy, ascites, fibro-cystic disease of the uterus, extra-uterine fœtation, hydramnios, have deceived the most experienced living authorities. Therefore he will hurriedly express no opinion either to patient or friends; nor, indeed, will he commit himself, in case of doubt, to any final opinion, without a full examination and consultation, in an obscure case of 'abdominal' or 'pelvic' tumour, until such time as its nature is clearly defined. Should any uncertainty remain, it is better to leave the question an open one. This is the more necessary, as in many instances he may not have the means nor opportunity of applying such crucial tests as aspiration, paracentesis, the microscope, and chemical analysis. One caution more I may add here. Even when the fact of the existence of an ovarian cyst is decided, we have to recollect that complications may exist, such as pregnancy, ascites, inflammatory conditions of the pelvic or general peritoneum, malignant disease, uterine tumour, cysts of the abdominal viscera, etc. There may be two ovarian tumours; one may escape detection. (Should the two ovaries be involved, there may be a double tumour and a well-marked sulcus between.) Before we finally express any decided opinion, it is well to exclude the possibility of any complication, as, through it, the case afterwards may assume much more serious proportions, and there may be the reflection on the part of the patient's friends that it had escaped detection.

Treatment.—This practically resolves itself into—

General.
Palliative.
Removal of the cyst.

It would be sheer waste of time to discuss the general treatment of ovarian tumours by drugs. We may maintain the general health and support the patient's strength by suitable tonics and the administration of proper nourishment, while we see that sufficient time is spent in the open air, and the mind is, as far as possible, prevented from dwelling on the malady and the chances of recovery. The bowels generally require attention, and the bladder may have to be relieved in consequence of pressure; any secondary changes in the cyst, or such an accident as hæmorrhage, must be dealt with as they occur. The one treatment for ovarian tumour, with rare exceptions, is ovariotomy. I have already referred to the operation

DIFFERENTIATION OF UNILOCULAR, MULTILOCULAR, PAROVARIAN, AND MALIGNANT CYSTS.

UNILOCULAR CYST.	MULTILOCULAR CYST.	PAROVARIAN CYST.	MALIGNANT CYST.
Surface smooth.	Surface irregular and lobular	Occurs in young persons.	Occurs more frequently after forty.
Fluctuation free in all directions.	Fluctuation circumscribed and interrupted.	Is comparatively rare.	Nodular and irregular.
Growth not so rapid.	Growth rapid	Fluctuation very superficial, and walls of cyst very thin.	Grows rapidly.
Contains the usual ovarian fluid.	Contains often blood corpuscles, and the fluid is denser, and perhaps discoloured.		Solid contents, or is solid.
Circumferential measurement below umbilicus 35–45 inches (Peaslee).	Circumferential measurement below umbilicus 55–78 inches (Peaslee).		
Adhesions not common.	Adhesions common.		Glands involved.
General health not so rapidly involved.	Rapidly fails.	Does not affect the general health much.	Emaciation and cachexia come on quickly.
			Pain is present, especially at night.
If tapped the tumour is emptied, and quickly refills.	On tapping we do not empty the tumour	Does not usually refill after tapping	Ascitic fluid surrounds the tumour, and on examination the 'proliferating cell' of Foulis is detected in the fluid examined.

of paracentesis abdominis and the methods of performing it, and vaginal paracentesis.

The day of tapping an ovarian cystoma has passed.

Spencer Wells did not consider that tapping increased to any appreciable extent the mortality after ovariotomy, and thought that in cases of simple ovarian, or extra-ovarian, cysts, it was right to try the effect of one tapping before advising a patient to undergo a more serious risk.

He considered that tapping might sometimes be a useful prelude to ovariotomy, either as a means of gaining time for a patient's general health to recover, and clearing the urine of its load of albumen, with which it is sometimes charged under the mere influence of pressure, or of lessening shock by relieving her of the fluid a few hours or days before removing the solid portion of an ovarian cyst.

Tapping through the rectum is a step we need not consider; and all other means, such as injection of iodine, and the formation of a permanent opening in the cyst, have been generally abandoned. Spencer Wells recommended the injection of the iodine when, after tapping by the abdominal wall or elsewhere, inflammation had occurred, and the patient was suffering from the decomposing contents of the cyst. It is well to deodorize the fluid which escapes. This lessens the risk of pyæmia and septicæmia. A solution of one part of iodine and two of sulphurous acid to twenty of water, or of one part of sulphurous acid to eight of tepid water, is used. This is injected night and morning.

Coolness, nerve, readiness of resource, decision, and frequently manipulative skill, are required in the careful removal of *complicated* ovarian cysts. The operator who feels that he has *in himself* these qualities may have no hesitation in operating. *He who does not, has no justification in attempting an operation frequently requiring all of them.*

Spencer Wells' observations on the expediency of operating are worthy the attention of all surgeons :—

'With the experience of the nine years which have elapsed since the publication of my edition of 1872, I have become more and more disposed to advise the removal of an ovarian tumour as soon as its nature and connections can be clearly ascertained, and it is beginning in any way, physically or mentally, to do harm, since the risk of the operation under such circumstances is certainly less, and the possible evils of delay are eluded. The probable result of ovariotomy can be estimated with far greater accuracy by a knowledge of the general condition of the patient than by the size and condition of the tumour. In other words, a large tumour, extensively adherent, in a patient whose heart and lungs and digestive and eliminative organs are healthy, and whose mind is well regulated, may be removed with a far greater

probability of success than a small unattached cyst from a patient who is anæmic or leukæmic, whose heart is feeble, whose assimilation and elimination are imperfect, or whose mind is too readily acted upon by either exciting or depressing causes. I believe this to be the explanation of the facts which have led some superficial observers to assert that the more advanced the disease the greater, and the earlier the stage of the disease the less, is the probability of recovery. I am convinced that this reasoning is based on the observation of a few exceptional cases where small unattached tumours have been removed with a fatal result from unhealthy or infected persons, or where large attached tumours have been successfully removed from persons who have otherwise been constitutionally sound. Small unattached tumours in strong healthy persons have by no means given the best results. It is possible to operate too early as well as too late—to place a patient's life in peril by operation before it is endangered by disease—just as it is possible, on the other hand, to delay operation until the powers of life are so exhausted that recovery after a severe operation is impossible.'

'It is still,' says Charles Noble, 'necessary to urge upon the profession the necessity of early operation in cases of serious disease of the pelvic and abdominal organs. The old policy of palliation and delay until the disease was approaching a fatal termination, before resorting to operation, is still claiming its many victims. This policy is the cause of most of the deaths in the hands of abdominal surgeons, and also of most of the partial successes which follow operations. The profession has at last accepted the teaching that delay is worse than bad in the treatment of ovarian tumours, and now it is universally conceded that cases of ovarian tumour should be submitted to operation as soon as a diagnosis is made. Tapping and all other forms of palliative treatment have fallen into deserved disrepute.'

CHAPTER XXXVII.

CLASSIFICATION AND PATHOLOGY OF SOLID TUMOURS OF THE OVARY.

THE tumours that are found in connection with the ovary and the structures connected with it may be classified as follows:—

1. Fibromata.
2. Myomata.
3. Sarcomata.
4. Carcinoma.
5. Endothelioma.

For the better understanding of this classification the student should study in connection with it Fig. 503, showing diagrammatically the various structures involved. He should also bear in mind that organs are liable to any kind of new growth, of which the physiological prototype is found in its individual tissues. We find accordingly that from the connective tissue elements in the ovary are derived Fibromata and Sarcomata; from the muscular tissue prolonged into the ovary from the ovarian ligament are derived Myomata; from the epithelial elements in the ovarian follicles Carcinoma may develope; from the follicles themselves may grow cysts—Adenomata, or Dermoids; from the paroöphoron are derived papillomatous cysts; from the persistent mesonephric tubules, that constitute the parovarium, originate Parovarian cysts; and lastly, from a persistent mesonephric or Wolffian duct may arise a Gartnerian cyst (Bland-Sutton).

In describing the tumours of the ovary, the order adopted in the above classification will be followed.

A. *Tumours.*—1. *Fibromata.*—These rare tumours of the ovary attain dimensions varying from that of a hen's egg to about three times this size. According to many authors they occur most frequently in young women (see case of Author, p. 718); of seventeen cases recorded by Leopold, thirteen were in patients from 5 to 30

years of age, and only four in women above 30. Dartigues, on the other hand, found that of twenty cases, six occurred from 20 to 30, six from 30 to 40, six from 40 to 50, and two above the age of 50. Large tumours have been recorded, weighing 10 to 20 lbs.; but these have been fibromyomata, not pure fibromata. The growth almost always affects one ovary only. The Fallopian tube is separate and free, except in the case of some of the larger tumours; the pedicle is formed by the broad ligament, and is usually rather slender. The tumour appears as a smooth, rounded, or lobulated mass, greyish-white, or of a marbled aspect; it feels firm, and on section presents a surface usually solid, but sometimes dotted over with a small-cystic degeneration. There is no definite capsule such as is found in the case of uterine fibromata. These growths present a marked contrast to the malignant ovarian tumours, in the absence of ascites and, usually, of adhesions; when the latter are present, they are mostly omental. Fibromata are apt to undergo calcification and even ossification, more rarely suppuration.



FIG. 528.—FIBROMA OF THE OVARY. The bands of pure fibrous tissue bear small fusiform nuclei, and include small cells with oval nuclei. (Doran.)

Some cases described as fibromata have really been sarcomata; others have properly belonged to one or other of the varieties of mixed growths, such as fibro-myoma, fibro-sarcoma; lastly, some should be classed as myomata or cavernous fibromata. Pure fibromata have, however, been met with, though undoubtedly very rare. Rokitansky has described a special variety under the name of fibroma of the corpus luteum.

2. *Myomata.*—Clinically, these very rare tumours are indistinguishable from fibromata, and what has been said above applies here. A case of pure myoma of the ovary has been recorded by Singalli; the muscular fibres are of the non-striated variety; Vignard described a case in which they were striated, but this was in a myo-sarcoma.

'True fibrous tissue,' Doran observes, 'is naturally abundant in

the tissue of the hilum (paroöphoron); this fact is enough to account for fibroma of the ovary' (Figs. 528–530). 'Ovarian fibromata,' says Bland-Sutton, 'are very rare. Many specimens described as such have turned out, on careful re-examination, to be typical spindle-celled sarcomata. It is very difficult to obtain reliable and complete records of a sufficient number of cases to enable a satisfactory description of the clinical aspects of ovarian fibromata to be written.'

I record the particulars of the following instructive case, as it not alone exemplifies the difficulties of diagnosis, but also is a typical example of pure fibroma of the ovary. In fact, there are few so typical on record.

Fibroma of the Ovary.

Miss H——, aged twenty-two, consulted me for persistent sickness associated with periodical epigastric pain and considerable anæmia. For eighteen months previous to seeing me the catamenia had been absent. These were the only symptoms present. I made a careful examination of the lungs, heart, and abdominal viscera, with a negative result. I suggested a Weir-Mitchell course, and an examination of the urine and blood, as I was apprehensive that the anæmia might be of a pernicious character. Her medical attendant acquiesced in this view, and accordingly she entered a medical home for treatment. The morning subsequent to her admission I made another abdominal examination, and was surprised to find a movable tumour about the size of a small orange in the left inguinal region. The patient herself was unaware of its existence, nor had she suffered any pain other than the epigastric. The following morning, under ether, I made a vaginal examination, and discovered a tumour lying between the uterus and bladder in the middle line, hard and movable. The choice lay between a dermoid cyst or fibroma of the ovary. I determined its freedom from both bladder and uterus, though it was evident that by the distended bladder on the previous morning it had been raised from its pelvic position, to which it sunk when the bladder was empty.

'The ovarian tumour shows microscopically nucleated spindle-celled tissue, which is arranged in very definite interlacing bundles. The coarseness of the tissue, the distinct formation of fibres, and their wavy arrangement, are good reasons for regarding the tumour as a fibroma rather than a sarcoma. Sections have been made from different parts, and they all show the same appearances. The vessels in the tumour are numerous and well formed.'

'The naked-eye appearance of the small fragments of the ovarian tumour which have been preserved is somewhat like that of uterine fibroid. The cut surface shows white fibrous strands which interlace, but are not arranged in whorls. Here and there small gray areas may be seen distributed among the white strands. There is a distinct capsule composed of thick white peritoneum and a subjacent layer of cellular tissue traversed by numerous vessels, some of which are of considerable size. Septa pass from this capsule into the

tumour for a short distance, indicating that the tumour has a tabulated outline. The serous surface of the fragments is quite free from adhesions.

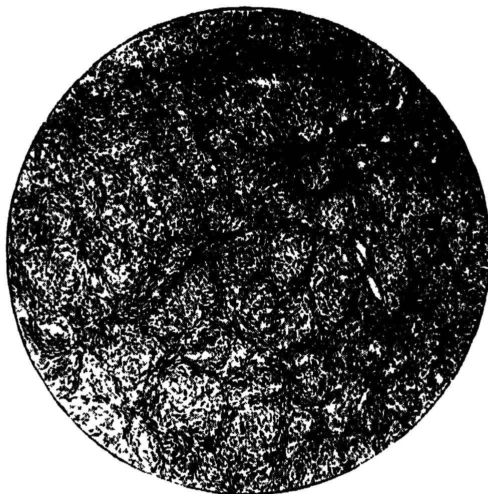


FIG. 529.—MICROSCOPICAL SECTION ($\frac{1}{8}$-in. obj.) OF FIBROMATOUS TUMOUR OF THE OVARY. (Author.)

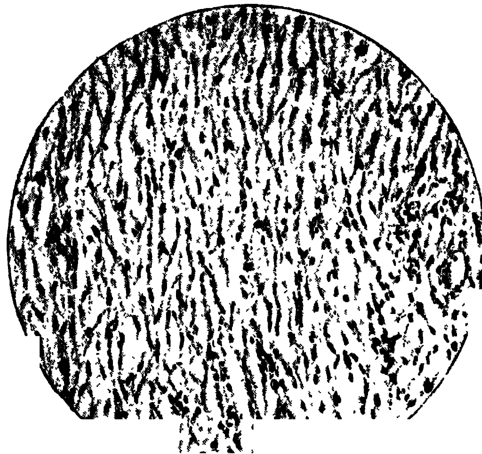


FIG. 530.—MICROSCOPICAL SECTION (1-in. obj.) OF FIBROMATOUS TUMOUR OF THE OVARY. (Author.)

The tumour as a whole feels firm and elastic, but less dense than the common fibroid.'

The other ovary was not typically healthy, as there was some cystic

proliferation, and it was very slightly enlarged. However, there was nothing to demand its removal.*

Note, in connection with this case, the youth of the patient, the absence of menstruation, the painlessness of the tumour, its extreme hardness to the touch, its freedom and mobility, and associated movement with the bladder.

Muscular tissue (Doran) is found amidst the parenchyma of the ovary in the coats of its vessels, and also in free bundles derived from the ovarian ligament, a process of the uterus. The connective tissue of the ovary around the follicles is variable in character, but, as a rule, of a 'young' type. Sarcoma of the ovary (Fig. 532) is not rare, owing probably to the frequent abundance of this 'young' connective tissue. As muscular tissue naturally exists in

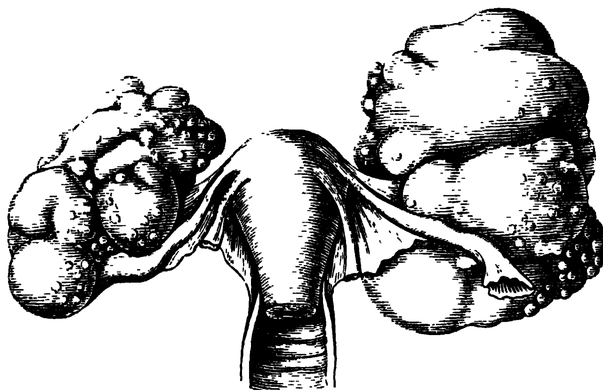


FIG. 531. –FIBROMA OF BOTH OVARIES. (Cullingworth.)

the ovary, the development of myoma can be accounted for. Many cases of fibromyoma of the ovary have been described. The ovarian ligament is entirely composed of fibrous tissue and plain muscular fibre; in two instances, at least, large myomata have been observed to spring from that ligament, which is really a process of the uterus running to the ovary.

Cullingworth exhibited before the Obstetrical Society of London an interesting specimen of fibroma of both ovaries, which he removed after death from a woman, aged thirty-six, who died of ascites (Fig. 531). She had been pregnant five years previously, and had noticed a swelling in the right groin about this time at the conclusion of the pregnancy. The tumours lay in front of and behind the uterus—the larger of the two behind. They were

* See also page 64 for case of adeno-fibroma of the ovary (author).

non-adherent. Some of the tumours partook in part of the cystic character (*Trans. Obstet. Soc.*, vol. xxi., 1879).

3. *Sarcomata.*—These are the most common solid tumours of the ovary. They have been seen at all ages, from 10 to 60. Some authors maintain that they are most prevalent in childhood; and it can at least be said that of the solid ovarian tumours found in children, sarcomata are by far the most frequent, but Dartigues found that of twenty cases, only two occurred in patients under 20, five between 20 and 30, four between 30 and 40, seven between 40 and 50, and one at 60. It has been observed in the case of fibromata that the majority of the patients had been sterile; it is otherwise with sarcoma, which has been found most often affecting multiparæ. Sarcomata are among the largest of the solid tumours affecting the ovary; the majority attain the size of a fist, a fœtal head and even an adult head, and remarkable instances of even greater size are on record, as, for instance, Homan's case of 22 lbs., Viguier's of 44 lbs., and Clemens' of 88 lbs. These tumours are often bilateral; they present a whitish aspect, with the surface often marked with a fine vascular network. It is not unusual to find, on section, numerous cavities resulting from cystic degeneration. The pedicle is often thick and fleshy, notwithstanding which it is very prone to torsion. This complication is favoured by the abundant ascites which is usually present, and in consequence of which the tumour has considerable mobility. In other cases the tumour becomes fixed by adhesions, principally to intestine and omentum, and less often to the uterus and the adjacent pelvic peritoneum. Secondary deposits are common in distant organs, such as the liver, lungs, breast, and bones; whilst a diffuse metastasis may occur over the peritoneum. Several histological varieties have been described, of which the most malignant appears to be the small

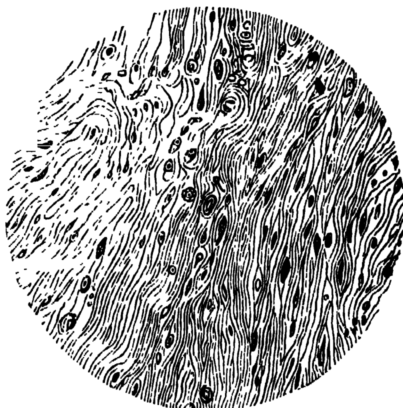


FIG. 532.—SARCOMA OF THE OVARY. From a portion where much fibrous tissue was blended with spindle cells. (Doran.)

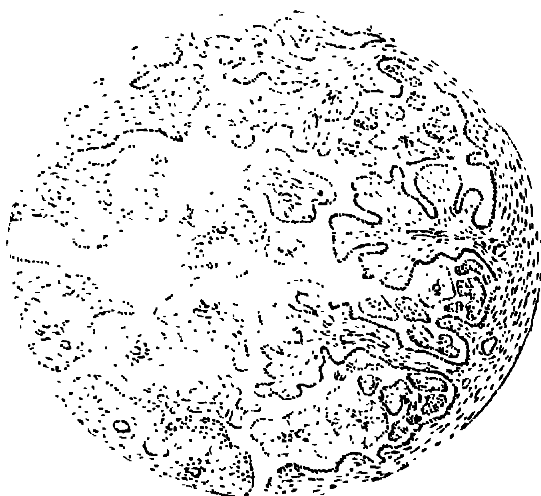
spindle-celled type. The mixed forms, such as fibro-sarcoma, sarco-myoma, and sarco-lipomata, are less malignant. Myo-sarcoma, with non-striated muscular fibres, has been described by Virchow, and, as we have seen, Vignard has recorded a case where the muscle-fibres were striated. Endothelioma, which we shall describe presently, has also been included among the sarcomata.

4. *Carcinoma.*—Cancer of the ovary, secondary to the disease in the uterus or breast, is not uncommon; but primary ovarian cancer is rare, though apparently not so rare as fibroma. It is specially prone to attack women at or after the time of the menopause, but cases have also been recorded in quite young women. The growth seldom attains such large dimensions as are found in the case of sarcomata. As a rule both sides are affected. In the majority of recorded cases the patients were multiparæ. In appearance, these tumours are usually of irregular, nodular form; dark in colour, ranging from wine-red to purple. The consistence varies with the histological characters; the encephaloid variety is soft and elastic, but the scirrhus, as in other parts of the body, is hard and even stony, and on section, as French authors express it, '*crie sous le scalpel.*' Ascites is a constant feature of ovarian cancer; the fluid is less abundant than is the case with sarcoma, but is usually blood-stained. Hydro-thorax is frequently also present, even apart from secondary deposits in the pleura. These remarks apply, not only to primary ovarian cancer, but also to the secondary form, and to cysts undergoing malignant changes. Metastasis occurs in the lymphatic glands, and in distant organs, such as the lungs, liver, and intestines; and by direct extension the growth may involve the uterus and adjacent pelvic peritoneum. Microscopically, two forms can be distinguished—scirrhus and glandular carcinoma. The examination requires to be made with great care, for, as Bland-Sutton points out, the alveolar disposition of cancer is imitated by ovarian follicles being entangled among the cells of the tumour in some cases of sarcoma.

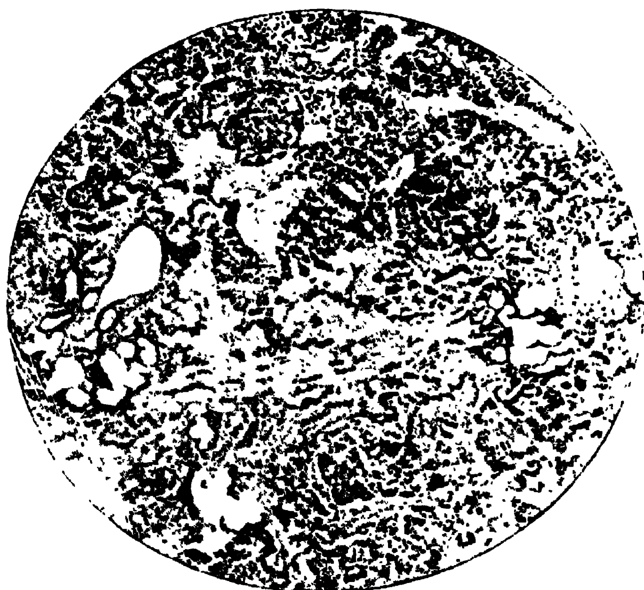
The following table, showing the characteristics of the principal solid tumours of the ovary, is based on a valuable synopsis of solid tumours of the ovary by Dartigues.*

* *Revue Gynécologie* (Pozzi), June–August, 1899.

PLATE XXVII.



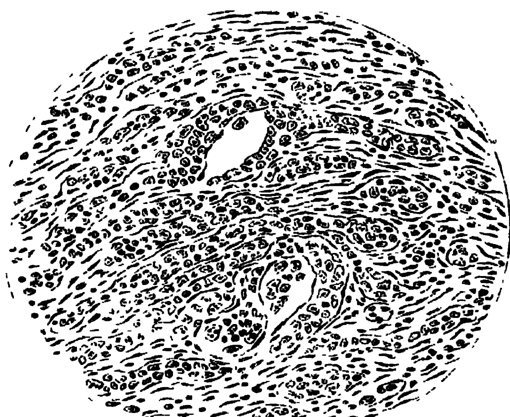
Section of Papillary Ovarian Cystoma (Author)



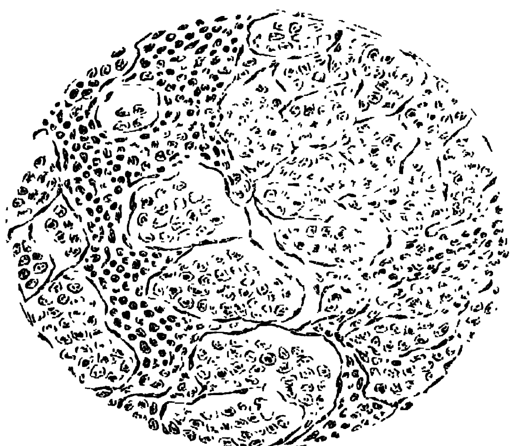
Section of Endothelioma of the Ovary (Ludwig Pick.)

To face p 722.

PLATE XXVIII.



SECTION OF PRIMARY CARCINOMA OF OVARY—SCIRRHUS (Targett.)



PRIMARY CARCINOMA OF THE OVARY SOFT. (Author.)

[To face p. 723

OVARIAN FIBROMYOMA.	OVARIAN SARCOMA.	OVARIAN CARCINOMA.
Very rare.	Rarer than sarcoma, less rare than fibroma.	The least rare solid tumour.
Age, 20 to 50; some authors say mostly in young women.	Age, middle life, 40 to 50; some say mostly in childhood.	Age, mostly over 50; occasionally before 25.
Usually only one ovary affected.	Both sides often affected.	Both sides usually affected.
Colour, whitish grey or marbled.	Whitish, with light vascular network.	Reddish or purple.
Usually smooth, rounded reniform or lobed.	Usually shape of much enlarged ovary.	Mostly nodular and lobulated.
Seldom larger than a fist; often size of egg.	Often size of fœtal or adult head.	Size from fist to fœtal head.
Intestinal adhesions rare; sometimes omental; uterus usually free.	Often adhesions to intestine and omentum, with fixation of uterus, etc.	Usually no adhesions, tumour mobile though large.
Firm consistence; no capsule; solid on section, or with small cysts.	Elastic, sometimes soft, often cystic transformation: sometimes cavernous, from large vessels.	Hard, sometimes elastic, cuts harshly, cancer juice on scraping.
Histological varieties :—		
Pure fibroma.	Pure sarcomata.	Scirrhus.
Fibromyoma.	Fibro-sarcoma.	Encephaloid.
Pure myoma.	Sarco-myxoma.	
Fibroma of corpus luteum.	Sarco-lipoma.	
Cavernous fibroma.	Endothelioma.	
No ascites.	Abundant ascitic fluid, greenish or straw-coloured.	Blood-stained ascitic fluid, usually scanty.
No metastatic deposits.	Deposits in liver, lungs, stomach, breast, bones, and peritoneum.	Deposits in lymphatic glands, pelvic organs, and distant viscera.

5. *Endothelioma and Gyroma.*—These two forms of new growth have been studied especially by Mary Dixon Jones, and the following account of their characteristics is based on a private communication which she has obligingly sent me. Both forms of growth are attributed to previous inflammatory changes, resulting, in most cases, from sepsis; and this in turn dates in most instances from a confinement.

Endothelioma is a new formation of blood corpuscles and blood-vessels, originating in pre-existing blood-vessels, from the endothelium of which the new growth is derived. It invades a great part of the ovarian tissue, and is generally associated with diseased ova, many of which show indications of colloid degeneration, and with the formation of cysts, the walls of which are formed by a stratified layer of inflammatory tissue. It frequently gives rise to hæmatomata

and blood cysts in the ovary. *According to the writer I am quoting*, these blood cysts seriously imperil the life of the patient; indeed, she regards an endothelioma as essentially a growth of a malignant type.

Gyroma appears in the form of a number of small nodular fibromata occupying the substance of the ovary; like endothelioma, it is regarded as the result of inflammation, of septic origin. It starts as an inflammation of the Graäfian follicles. Normally, a delicate membrane of a highly refractive character is all that should remain of such a follicle; but when it is inflamed, the membrane becomes thicker and convoluted, and is crowded with inflammatory corpuscles, till at last there is formed a broad, firm, convoluted wall; or, still progressing, there is developed what the writer at first called 'nodular fibromata,' and, later on, 'abnormal menstrual bodies.' Corpora lutea, as originally described, are regarded by Mary Dixon Jones as belonging to the category of gyromata.

The two forms of growth—Endothelioma and Gyroma— are frequently found associated, and they give rise to similar symptoms, viz. pain, often agonizing, a progressive emaciation, and a cachectic condition of the whole system. In some cases the loss of weight may amount to 20, 30, or 40 lbs. The patient becomes a chronic invalid, unable to follow any employment, and subject to various nervous disturbances, amounting in some cases to melancholia or dementia. The only treatment of any avail is the removal of the affected ovaries.

Cullen has reported a case of angio-sarcoma (endothelioma) of the ovary. The tumour, which was attached to the rectum and sigmoid flexure, involved the uterus and the sac of Douglas. It was a round and spindle-celled sarcoma. The cells were arranged round the blood-vessels. 'The vessels had an inner lining of endothelium, surrounding which in some places is a delicate muscular coat, the outer portions of which appear to have undergone hyaline degeneration. Immediately surrounding the muscular coat are eight to ten layers of spindle-shaped cells running parallel to the vessel.'

'These tumours have two chief sources of origin: first, those arising from the blood-vessels (Amann—four cases, Ackermann, Eckardt, Marchand); second, those springing from the lymphatics (Amann, Flaischlen, Leopold, Marchand, Pomorski, v. Rosthorn, v. Velits and Voight). These two divisions are again subdivided according as the sarcoma arises from the outer sheath of the vessels or from their endothelial lining.

'*The case quoted was undoubtedly perithelial in origin*, growing from the outer coats of the blood-vessels. As it is sometimes very difficult, and in fact impossible to say whether it arises from the outer or inner sheath of the

vessels,' Cullen thinks, 'the two divisions are sufficient, viz. those arising from the blood-vessels and those springing from the lymphatics.

'The tumours have occurred in children 7 years of age, and in women 64 years old. The average of eleven cases was 33 years.'

Operation for Ovarian Cystoma.

For the operation of ovariotomy for ovarian cystoma, the following instruments should be ready, sterilized :—

Péan's forceps.
Doyen's artery forceps.
Some clamp forceps, straight and angular.
Ovariotomy trocar—metal or glass.
Wells' smaller trocar.
Long blunt pedicle needle.
A few Deschamps' needles.
Some sharp curved needles with needle-holder.
Cyst forceps, for seizing cyst wall.
A few tenacula, single and double.
Syphon trocar of Tait.
Scissors, curved and straight.
A few large flat sponges, sterilized.
Sponge-holders, or catch forceps for sponges or dabs.
Various sterilized dressings.*
Paquelin's cautery.

The directions already given for the preparation of the room, patient, operator, and assistants, so far as all aseptic and antiseptic precautions are concerned, hold good for the operation of ovariotomy. The same remark applies to the instruments. The different kinds of suture and ligature used in cœliotomy have been described as well as dressings and the toilet of the abdominal wound. It will not be necessary here to enter into these matters; the instructions already given should be carefully studied and carried out.

The Operation.—The following are the steps of the operation :—

1. The abdominal incision.
2. Arrest of hæmorrhage.
3. Opening of the peritoneum.
4. Exposure of the cyst and management of adhesions.
5. Use of the trocar and evacuation of the cyst contents.

* See chapter on Asepsis and Antisepsis

6. Drawing out the cyst-wall and freeing it of other adhesions, if they exist.
7. Arrest of bleeding.
8. Securing the pedicle.
9. Peritoneal toilet.
10. Closure of the wound.
11. Dressing of the wound.

The assistants and nurses having taken their places, the operator, standing at the right side of the patient, makes an incision in the usual manner, about four inches in length, through the linea alba.

He keeps exactly in the middle line, avoiding the rectus sheath. If he should open the sheath of the rectus, he may either complete the incision by cutting directly through the muscle, or he can pass a grooved director in towards the middle line to guide him in the linea alba. Wells' pressure forceps are now applied to the bleeding-points, and all hæmorrhage is arrested by forci-pressure or ligature. The peritoneum is next caught with a dressing forceps, and it is opened with a scalpel laid horizontally beneath the forceps. If fluid be in the peritoneal cavity, the patient is turned a little on the side, and the fluid is allowed to run through an extemporized spout of the waterproof sheeting into a bucket at the side of the table. The cyst being now exposed, a trocar is taken in the right hand of the operator, and with it the cyst is pierced, and the fluid permitted to run through a tube into a side bucket. The sides of the abdomen are pressed forwards at the same time by an assistant. The sliding cannula, or shield, of the trocar shown in the drawing, regulated by a thumb-piece and bayonet-joint, can be pushed forward so as to protect the point of the trocar. The trocar of Tait is a simple instrument, and is also useful for flushing out the abdominal or pelvic cavity with saline solution or sterilized water. During the emptying of the cyst, if adhesions are exposed, they must be separated by a sponge or

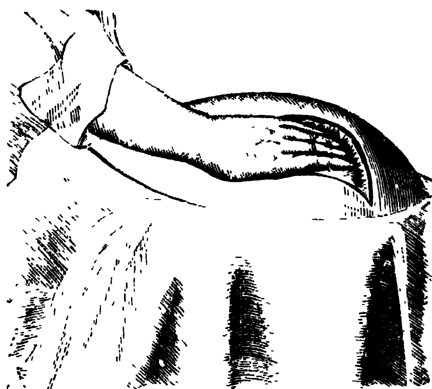


Fig. 533.—Examining Cyst-wall for Adhesions. (Spencer Wells.)

roll of gauze, which will be found most convenient for the purpose, and any bleeding vessels are seized and quickly tied with aseptic

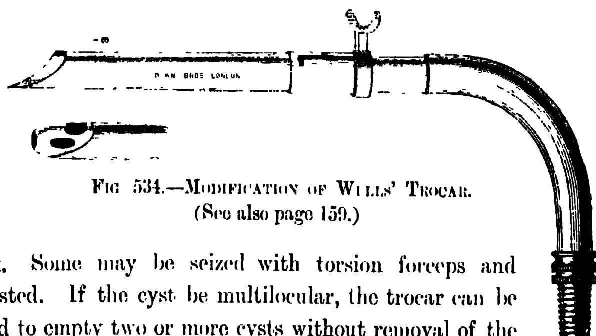


FIG 534.—MODIFICATION OF WELLS' TROCAR. (See also page 159.)

silk. Some may be seized with torsion forceps and twisted. If the cyst be multilocular, the trocar can be used to empty two or more cysts without removal of the instrument, by plunging it into each separately through the septum, separating the emptied from the full cyst. The cyst having been partially emptied, it is seized with cyst-forceps and

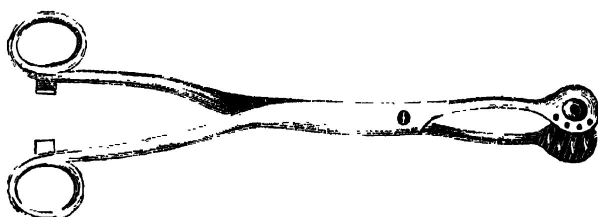
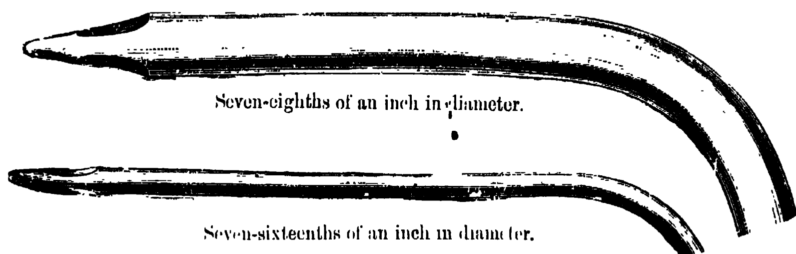


FIG. 535.—NÉLATON'S FORCEPS FOR SEIZING WALL OF CYST. See chapters on the Operative Treatment of Fibromyomata, for various toothed forceps, clamps, and other instruments required in cœliotomy.

drawn through the abdominal opening, any remaining adhesions being freed as this is done. The assistant, standing opposite the



FIGS. 536, 537.—TAIT'S ASPIRATING TROCARS.

operator, slips his right-hand middle finger inside the abdominal wound, including the entire structures divided, and he thus hooks

the abdominal wall forwards, securing both sides of the wound with the thumb and forefinger of the same hand. His left hand is thus free to keep pressure on either side if necessary. The large flat warm sponge is now carefully slipped in over the intestines to protect these and prevent prolapse. In an ordinary

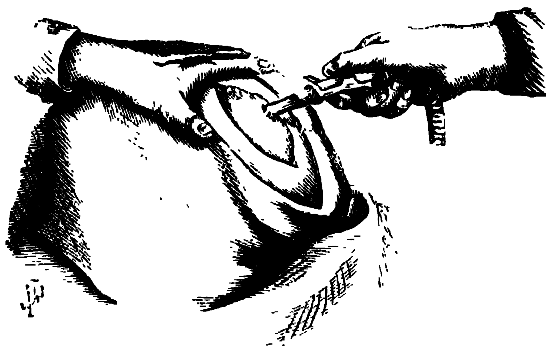


FIG. 538.—INSERTION OF TROCAR INTO CYST. (Spencer Wells)

ovariotomy, when there are few adhesions, the intestines should not be seen from first to last during the operation. The importance of preventing any prolapse of the bowel must never be lost sight of. Another assistant supports the tumour as it is drawn



FIG. 539.—DRAWING THE CYST OUT OF INCISION. (Spencer Wells.) *

and cut, and prevents dragging or traction, receiving the emptied cyst in a basin. The pedicle is now transfixed with a long blunt-pointed needle carrying a double silk ovariotomy ligature. This is cut and securely tied in the manner already described.† With

* This old trocar of Wells's is seldom now used; still it was an admirable instrument.

† See chapter on Sutures and Ligatures.

clamp forceps the pedicle is now held below the ligature, and the cyst is cut off at a sufficient distance from the latter not to run any risk of interference with it, yet leaving enough of the pedicle to enable us to examine its surface carefully before it is dropped into the pelvic cavity. When the cyst is thus removed, the other ovary and tube are thoroughly examined, and, if diseased, they are removed. To deal dexterously with adhesions, especially those found in the pelvis, is a matter of experience and manipulative skill. Some are easily separated by the fingers and sponge. Others require ligaturing and subsequent division. Some may demand division with Paquelin's knife. To see adhesions in the pelvic cavity the reflecting mirror is useful (p. 439).



FIG. 510.—GRASPING SOLID TRABECULAR TUMOUR. (Spencer Wells.)

THE PERITONEAL TOILET.—This is the portion of the operation which an inexperienced operator is apt to get through hurriedly, and it is also the part requiring most patience and care. When the pedicle is dropped back, the peritoneum is carefully dried with dabs or warm sponges, and all blood and serum sponged out. The abdominal cavity cannot be left too clear of any fluid or clots. On this depends, in a great measure, the success of the operation. If we have any serious doubt whether drainage is indicated, owing to obstinate hæmorrhage, prolonged oozing, or the infection of the peritoneal cavity by the escape of septic material or fluid into it, it is far better to put in a soft drainage-tube (iodoform gauze drain) before closing the wound.

When all is perfectly dry, the flat sponge is wrung out of sterilized warm water and carried under the wound over the intestines. A square of muslin may be used for the same purpose. Silk sutures are carried through the sub-peritoneal fascia and peritoneum. These are long enough to admit of the withdrawal of the sponge or muslin. Once more we inspect the abdominal cavity before it is finally closed. This is done by suturing separately the muscle with its fascia and the skin—the former with catgut, and the latter with silkworm gut. The abdominal wound is dressed in the usual manner, and the after-treatment is conducted on the same lines as in other cases of laparotomy.

Tait laid special stress on the advantage of washing of the peritoneum over sponging. He used his syphon trocars (large or small) both for drawing off the contents of the cysts and for syphoning the abdomen. The indiarubber tubing is attached to the open end of the trocar, and water at a temperature of 106° to 107°, or even to 120° in case of hæmorrhage, is syphoned into the abdomen. He used a special aspirating sucker to remove the remains of the fluid (Fig. 541). A sterilized glass or vulcanite syringe answers admirably.

SALINE IRRIGATION.—Hawkins Ambler,* writing on saline irrigation of the peritoneal cavity during operation, notices its effects in the tendency to cause shock even under anæsthesia, which is quickly followed by a reaction, with increase in volume and quality of the pulse. He quotes Sherrington's experiments of the effects on the blood of injuries on the intestines in various animals; the blood becoming inspissated, losing some of its plasma, while its chromocytes do not escape in direct proportion to the loss of plasma. This loss

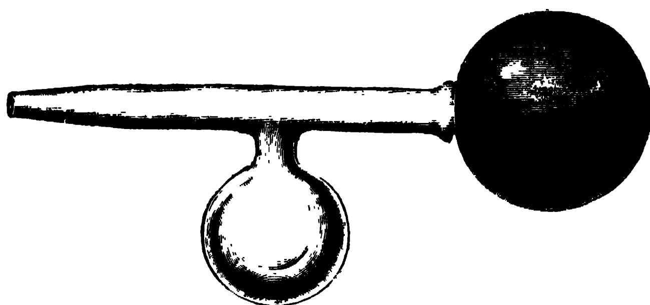


FIG. 541.—ASPIRATING SUCKER.

of plasma continues for a certain time after, the specific gravity of the blood being increased, while that of the plasma remains unaltered. Hawkins Ambler believes that the exuded plasma to a great extent lies free in the peritoneal cavity, influencing thus the bacteriacidal properties of the peritoneum, and also lessening its absorptive powers. Saline solutions are rapidly absorbed through the peritoneum into the circulation, and the well-known fact of the relief of post-operative thirst in cases in which irrigation has been used is thus explained. Shock, he says, is lessened, the pulse is improved, and the tongue remains moist and clean. He does not think that general peritonitis is much benefited by irrigation, and he considers that diffuse septic peritonitis can only be properly treated by turning out the intestines and cleansing the whole peritoneal cavity elaborately and systematically with sponges. He

* *British Gynæcological Journal*, February, 1899.

also considers that adhesions, if irrigation be practised during the operation, or saline solution poured into the peritoneal cavity, are less liable to arise. The experiments of Muscatello, in demonstrating the effects of the presence of foreign or irritative particles in the peritoneal cavity, in increasing in it wandering cells, not only explains the reaction against the use of drainage, but also the influence of saline irrigation in removing septic material and culture bacteria from it. The good influence of rectal injections of artificial serum, when given in cases of thirst, especially when we cannot give much fluid by the mouth, is well known. Irrigation is to be avoided in septic cases. The temperature of the fluid should be from 98° to 100° Fahr. It should not extend beyond the affected area, nor should it be too prolonged. All the conclusions in favour of peritoneal irrigation are equally applicable to that by the rectum.

Ovariotomy by Vaginal Cœliotomy.

When staying in Vienna in 1898, I saw Professor Schauta remove by vaginal cœliotomy a large-sized ovarian cyst. The anterior incision was made, the peritoneum opened, and the cyst pressed into it. It was then tapped and emptied, its walls seized, and the cyst with its pedicle drawn through into the vagina. The cyst was then removed after ligature of its pedicle, which was returned ; the peritoneum and vaginal wall were then carefully sutured. Schauta has also operated in this manner on multilocular cysts by emptying successively the cavities, also on broad ligament cysts, ligaturing the large vessels, emptying the cyst, and shelling it out. In cases where the peritoneum has become soiled by cyst contents, as in the case of dermoids, an iodoform drain is used. He limits this method of ovariotomy by the vaginal route to movable cysts without adhesions, and those which are not intra-ligamentary. The greatest care is necessary in diagnosis.

Fritsch, of Bonn, speaking of the causes of death after laparotomy, says *-- 'The most important organ was the peritoneum. In the peritoneum the physiological and pathological changes were very rapid. The time required for adhesion to take place was rather minutes than hours. Cocci were rapidly swept from the peritoneum into the blood and destroyed. But for cocci to become harmless three things were necessary. First, they must not be in too great a quantity. Secondly, an undisturbed circulation and a healthy heart were necessary; a lengthened operation, chloroform narcosis, loss of blood, and cooling, injured the circulation. Possibly, also, the hæmoglobin and the

* German Gynæcological Society, 1896.

chemical quality of the blood had to be taken into account. Thirdly, the functions of the tissues—here the peritoneum—must be normal. The cooling was of less moment than the contact with the air and the altered pressure after opening the abdomen. The injury thus caused was often visible to the eye. The injury to the peritoneum was the greater the more roughly and improperly it was treated. Even without direct infection, the operation might be dangerous. It must not be forgotten also that cocci, accidentally introduced or coming through from the intestines, might, under these circumstances, find conditions suitable for their growth. Generally the weakened intestines recovered their tone in a few hours. If, therefore, after twenty-four or more hours the heart were strong, and the pulse good, there was no danger. But with a weak heart and a quick pulse the normal function of the bowel was not restored. He had shown, then, that, independent of infection, there were two conditions closely connected with each other that were dangerous—viz. weakness of the heart and injury to the peritoneal and intestinal functions. Avoidance of infection was not the only important thing, as had hitherto been represented, but the maintenance of the general and local power of resistance.

'*Patients on whom laparotomy had been performed did not die because they became septic, but they became septic because they died or whilst they were dying.*

'Myotomy was more fatal than ovariotomy, because it took longer; and with every one the results became better as he learned to operate better.

'The course in unfavourable cases was the following: The patient awoke after the operation already distressed. The breathing rather heavy; the bandage pressing heavily, otherwise the binding was well borne. The characteristic symptom was the cardiac weakness, the quick, feeble abdominal pulse that was always pathognomonic. The abdomen was distended, the countenance pale; there was thirst, and vomiting was frequent; the temperature was normal; tympanites increased, and the pulse became worse. These were the symptoms of ileus; but there was no ileus, nothing of obstruction. They were peritonitic symptoms; but there was no purulent peritonitis. There was no sepsis; there could be no sepsis without fever. The distressing symptoms with suitable treatment disappeared. Otherwise on the third day or evening there was some fever, and this increased *ad finem vitæ*. Care in not operating on cases with weakened heart or in which were conditions of thrombosis, and perfect technique as well as avoidance of loss of time, were the important points.'

Ovarian Tumours and Pregnancy.—Though not a common complication, ovarian tumours occur sufficiently often during pregnancy to demand a special notice. The presence of the ovarian cystoma, or solid tumour, in the case of those cysts which are not bound down in the pelvis, may not be noticed until the pregnancy has advanced for some months. This is the more likely to occur if there are no adhesions which obstruct the upward movement of the tumour, or adhesions which connect it with the uterus and the pelvic viscera. More generally, however, attention is directed

to it either by the unusual size and appearance of the abdomen, or by symptoms due to twisting of the pedicle, that not infrequently causes some degree of peritonitis.

So far as interference is concerned, the decision will largely depend upon the time of pregnancy at which the tumour is discovered, its size, and probable effect on the life of the mother or the child; for there can be no doubt that statistics have proved that the complication of pregnancy with ovarian tumour is a very grave one, and must, with rare exceptions, be dealt with by operation. Dsirne, from the study of a hundred and thirty-five cases, arrived at the following conclusions:

1. The further pregnancy progresses, the more dangerous is the situation for mother and fœtus.

2. The puncture of ovarian cysts and the production of abortion are to be considered only in emergency.

3. Ovariotomy gives the best results for the mother in the second, third, and fourth months of pregnancy; for the product of conception in the third and fourth.

4. If an early ovariotomy be not possible from various reasons, it is to be carried out in the later months of pregnancy, as good results can even then be expected.*

Heikerg, from the statistics of two hundred and seventy-one cases not interfered with, found that one-fourth of the mothers succumbed and two-thirds of the children. On the other hand, the results in a hundred and eighty-five cases, collected by Weiss, Dsirne, and Mainzer, who were operated upon, show a mortality of from six to seven per cent.†

Thus we see that, save in the case of parovarian cysts, which may be emptied through the vagina by tapping, the course to pursue is to remove the ovarian tumour at the earliest possible date of the pregnancy. Still, if the tumour be not discovered until very late in the gestation, or that labour is approaching, it should be dealt with by paracentesis.

In operating on all ovarian tumours during pregnancy, the points to be remembered are—

(*a*) Care, in making the abdominal incision, not to wound the uterus; (*b*) to interfere with the uterus as little as possible; (*c*) to take special pains to tie the vessels separately, and in two places, and not *en masse*, remembering the special danger of hæmorrhage

* *Archiv. f. Gyn.*, No. 24.

† *Cent. f. Gyn.*, No. 26, 1882; *Beitr. Chir. Testschr. Th. Bilrooth, Munich, Med. Woch.*, No. 18.

after operation during pregnancy; (*d*) to treat the patient after operation with a view to prevent abortion, and make an exception in this case in giving morphia to quieten pain and secure rest.

The presence of diabetes complicating ovarian cystoma, or resulting from the operation of ovariotomy, has been noticed by many observers. While the occurrence of diabetes during pregnancy is not so uncommon, its presence as the result of ovarian tumour, and following ovariotomy, is rather unusual. In a case recorded by Halliday Croom, the tumour and the glycosuria stood in the relation of cause and effect. Some time after the ovariotomy, the sugar in the urine completely disappeared.

Halliday Croom did not believe that the sugar in this instance was solely dependent upon interference with the glycolytic function of the pancreas resulting from pressure of the tumour on that organ. It must also have been the result of interference with the hepatic circulation:

'A sudden relief of pressure, both local and general, in the abdomen, such as occurred at the operation, would act, not so much by stimulating the vaso-motor centres, as by causing a sudden dilatation of the large abdominal vessels, and consequent anæmia of the liver. This would explain the sudden but temporary fall in the amount of sugar secreted after the operation.'

It must, however, be seen that pressure on the portal vein may cause diabetes. Glycogen may be stored in excess, or sugar be carried through into the hepatic veins, dependent upon the rapidity of the hepatic circulation. Pressure on the hepatic arteries may equally bring about glycosuria. That nervous excitation, direct or reflected, may be the cause of glycosuria in ovarian disease, or after ovariotomy. is also to be remembered. The production of glycosuria after operation, in the case of a large ovarian cyst, is more likely to be due to the sudden removal of pressure and the consequent increase of rapidity in the hepatic circulation. The prolonged administration of chloroform will also produce glycosuria.

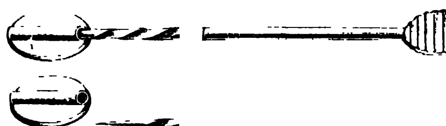


FIG. 512.—WARD'S TRANSFIXOR.

Charles Ward of Pietermaritzburg has a modification of Kœberlé's hysterectomy pin. The cut explains the modification. 'In abdominal sections where the patient's condition renders it advisable to bring operative procedures to a close as quickly as possible they are most useful, as the abdominal wound can be closed in a minute, and the anæsthetic stopped, the rest of the proceedings not requiring the use of an anæsthetic. . . . Pass the "transfixor" about ¾ of an inch from the margin of the wound, and go through all the tissues involved in ordinary gaping wounds: except in abdominal cases, in which it should be passed down to Cooper's fascia or subperitoneal tissue, and brought out in a reverse manner on the other side. Unless the peritoneum has been separated from the abdominal parietes it will be found to be in thorough apposition: no stitching is required.'

CHAPTER XXXVIII.

AFFECTIONS OF THE VULVA.

ATRESIA.
Iermaphroditism.
Hypertrophy of the nymphæ and clitoris.
Hyperæsthesia (generally associated with vaginismus).
Erythema.
Erysipelas.
Eczema.
Herpes.
Pediculi.
Pruritus.
Lichen (extremely rare).
Lupus.
Oozing papilloma.
Rodent ulcer.
Epithelioma.
Medullary cancer.
Melanosis.
Elephantiasis.
Syphilis:
- Primary syphilitic sores.
- Secondary syphilides.
- Condylomata.*

Vulvitis:
- Simple.
- Purulent.

Vulvitis - Phlegmonoid.
- Specific.
- Follicular.

Phlegmonoid inflammation of the labia majora.
Abscess.
Gangrene (noma).
Vegetations.
Cysts.
Varix.
Hæmatoma (hæmatocele, wrongly called thrombus).
Pudendal hæmorrhage.
Tumours:
- Elephantiasis.
- Pediculated.
- Sessile.
- Neuromatous.
- Sebaceous.
- Fibrous.
- Lipomatous.
- Sarcomatous.
- Cystic.

Hernia of ovary.
Hernia of intestine.
Hydrocele.

I have here enumerated all the more important affections of the vulva. I shall deal briefly with those that most commonly come under the observation of the gynæcologist.

* Tarnovsky (St. Petersburg) has described a true *trachoma pudendorum*

Atresia of the Vulva, congenital or acquired.—Congenital malformation of the vulva may accompany hypospadias and other congenital anomalies of the genital organs. The vulva may, in very rare cases, be entirely absent, or it may permanently retain its infantile form. The labia majora or the nymphæ may be adherent, and, occasionally, the former are so united posteriorly as to present the appearance of an enlarged perinæum. The vulvar orifice is sometimes closed from the same causes that produce atresia of the vagina.

Hermaphroditism.—I do not here discuss the embryonic defects in development of the external organs of generation that cause the various malformations seen in the adult female. A few points are worthy of notice. Arrest of development of the genital tubercle, or its division, is associated with absence of the vulva or atresia of the vagina, while other deviations in the completion of the urethra, vagina, and anus, through the partitioning of the fœtal cloaca, lead to the various abnormalities found in the vulva, urethral orifice, and clitoris, resulting either in hypertrophy of the lips or closure of the orifices, both of the vulva and urethral meatus. In other cases, owing to similar arrest of development, the bladder, vagina, and rectum may open into a cloaca common to all three, or hypospadias may be the consequence.

In this latter state, in one form, while the clitoris is hypertrophied, there is a long vestibular canal into which the vagina opens; in the other, the allantois is entirely converted into the bladder, the urethra is absent, and the former viscus opens directly into the vestibule. Here the perinæal body is present.

Pozzi, in discussing the term hermaphroditism, denies that there is any such thing as a true hermaphrodite, the appearance of a double sex being due to these malformations referred to in the genital organs, which are arrested in the embryonic condition in man, or through the excessive development of certain parts in the woman, the greater number of pseudo-hermaphrodites being men afflicted with hypospadias. The test of sex in such cases must be the presence or absence of the testicles or ovaries, obviously most difficult in certain cases. Bearing on this, the following case of Martin is of interest:

Testicles in Inguinal Canal of Hermaphrodite.—Christopher Martin (Birmingham) removed a testicle from the inguinal canal of a hermaphrodite. The patient was twenty years of age, had been brought up as a girl, and earned her living as a nurse. She had never menstruated. She had been operated on by another surgeon for a right inguinal hernia, radical cure being performed. At this operation a solid oval body, supposed to be an ovary, was found in the sac, and returned into the peritoneal cavity. In January, 1894, she consulted Martin with reference to an inguinal swelling, which had formed on the left side. She also wished to know 'why she was never unwell

like other girls.' Neither her features nor her voice were masculine. There was no development of beard or moustache. The breasts were flat and poorly developed. The figure was slim, but more suggestive of the female than the male sex. There was a distinct mons Veneris, but an entire absence of hair on the genitals. The scar of the previous operation was visible on the right side, but there was no hernial protrusion. In the left inguinal region was a small oval swelling, tender to the touch, and producing a sickening sensation on pressure. It was solid, and could not be reduced into the abdomen. There was no impulse on coughing. It was situated immediately over the external abdominal ring. The external genitals exactly resembled those of a nulliparous female. The labia majora and minora were normally developed. The clitoris was of the natural size; it was not grooved, and did not resemble a penis. On separating the labia the urethra was seen opening in the middle of a normal female vestibule. The vagina, however, was only represented by a short blind *cul-de-sac*, three-quarters of an inch deep, admitting only the first joint of the forefinger. No trace of a cervix or uterus could be felt. The urethral canal was about one and a half inches long, and was not surrounded by anything resembling a prostate. On introducing a sound into the bladder, and the forefinger into the rectum, no solid body like a uterus could be discovered intervening.

As the inguinal swelling gave the patient much discomfort, Martin decided to operate. He made an oblique incision over it, and laid open a serous sac enclosing an oval solid body about one inch long. This, on closer examination, proved to be a testicle, and the sac the tunica vaginalis testis. The gubernaculum testis was well marked, and passed into the tissues of the left labium majus. The testicle was freed from its surroundings, the cord isolated, ligatured, and divided, and the organ removed. The peritoneal cavity was opened at the upper end of the inguinal canal, the forefinger introduced, and the pelvis explored. No trace of a uterus could be felt, but the vas deferens could be made out—when the cord was dragged on—as a tense band coursing backwards, downwards, and inwards by the side of the bladder. The gland on the other side could not be felt. The patent inguinal canal was then closed with buried silkworm gut sutures, effecting a radical cure. The patient made an easy recovery from the operation, and has remained quite well.

Professor Allan, of Mason College, examined the organ removed. It had a well-marked tunica vaginalis testis. The epididymis arched around the posterior border of the gland, and the globus major, the globus minor, and the digital fossa were normally developed.

On section, the secreting tissue was enveloped in a tunica albuginea. Professor Allan made a series of microscopic sections of the gland, which proved it unmistakably to be a testicle. The seminal tubules were shown in various stages of development, and in a few tubules imperfect spermatozoa were distinguished.

In October, 1894, Martin removed from the right groin of the patient what proved to be the right testis. There was an excellent recovery. After the first testis was removed, hair began to grow on the pubes, and symptoms of hysteria developed. After the second was taken away, the breasts became swollen and tender, and were more fully developed. At the same time 'heats

and flashes' were complained of, which recalled those of the menopause. Microscopic sections of this testis were also made by Professor Allan. Martin concluded that in this case the true sex was *masculine.*

It is extremely interesting to note that the patient's sister—two years her elder—has never menstruated, has infantile breasts, has no pubic hair, has only a short *cul-de-sac,* one inch long, for a vagina, and no signs of a uterus. At the time of the conception of both the father was insane.

Pozzi divides all forms of this malformation under three heads: (1) Partial pseudo-hermaphroditism, sub-divided into *gynandres* and *androgynes;* (2) complete pseudo-hermaphroditism, due to perineo-scrotal hypo-spadias; (3) so called true hermaphroditism. In the

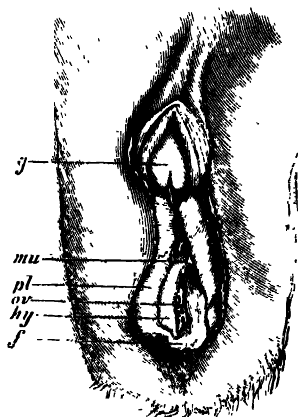


FIG. 543.—PSEUDO-HERMAPHRODITISM, WITH PERINEO-SCROTAL HYPOSPADIAS. *g*, gland; *mu*, meatus urin.; *pl*, lab. min; *vo*, vulvar orifice; *hy*, hymen; *f*, fourchette.

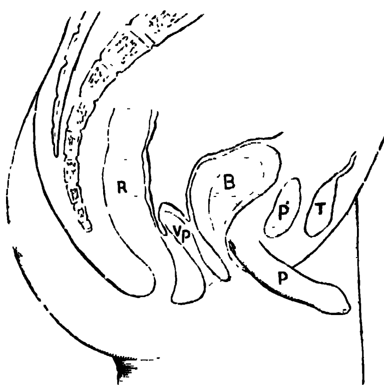


FIG. 544.—PSEUDO-HERMAPHRODITISM, WITH PERINEO-SCROTAL HYPOSPADIAS (Zweifel). *B*, bladder; T, testicle; P', symphysis; P, penis (hypospadic); *pv*, prostatic vesicle and pseudo-vagina; R, rectum. (Pozzi.)

first variety, *gynandri,* the appearances are due to hypertrophy and abnormalities of the external organs of generation in the woman, such as occur in the clitoris and labia. In the second, *androgyni,* we meet with men (monorchids or crypt-orchids) having certain external characteristics of the woman, as, for instance, excessive development of the breasts, and feminine characteristics in the genital organs, which give a feminine appearance.

In pseudo-hermaphroditism, rightly called, there is a perineo-scrotal hypospadias. There are individuals who have been regarded from birth as women, but who have sexually rather the attributes of

men. Coitus takes place through an enlarged urethral orifice, from which hæmorrhage occurs. This has been mistaken for true menstruation. In such hermaphrodites the hypospadias may give the appearance of a rudimentary vulva; the half-developed and hidden testicles secrete a sterile fluid. The feminine aspect is further added to by the mammary development, the small larynx and feminine voice, while the presence of a beard gives a sort of paradoxical contradiction to the otherwise female characteristics.

True hermaphroditism, divided by Cleps into *bi-lateral*, *uni-lateral*, *and lateral*, assumes the presence at one or both sides of an ovary and testicle, or ovaries and testicles. In the celebrated case of Catherina Hohmann, regarded by Rokitanski as veritable hermaphroditism, there was regular menstruation, and there were feminine characteristics. This woman (?) cohabited as a woman for twenty years, and then married as a man. But in this, as in other cases, Pozzi and others doubt whether the condition was not due to those causes to which I have already referred.

Case of pseudo-hermaphroditism, in which there was a divided scrotum with masculine uterus and patent utero-genital canal.

Arthur Maude has recorded an interesting case; and here it is important to notice that the father of the hermaphrodite had been insane, and that another child had died of tubercular meningitis. The general conformation of the subject was masculine; but though the hair of the head was comparatively short, there was none on the face. The age was thirteen and a half years, and he thus describes the anatomical features of the parts:—

'The genitals show no mons veneris; there is a penis about one and a quarter inch long, rather small for a boy of the age. The glans is well formed, there is no prepuce: the relative arrangement of the corpora cavernosa and spongiosum are normal. The urethra perforates the corpus spongiosum and glans, and there is no hypospadias. The penis is connected by a sickle-shaped fold or frænum of skin in the middle line of the posterior surface, so as to be slightly curved. This frænum extends from the frænum præputii to the root of the penis.

'From the root of the penis springs a divided scrotum, the halves of which are shut off into two complete sacs connected by an arciform web of skin, which flaps a short way over the genital cleft. This consists of a small vagina which will just admit my forefinger (which is very small) for about one inch.

'There are no labia majora, and no proper labia minora, but there is a sort of rudimentary flat space like the vestibule in front of the vagina and also behind.

'No cervix uteri could be felt, and no uterus through the rectum. The total length of the utero-vaginal canal is two inches measured with a sound, and it seems to terminate in a tapering canal above.

'There is no hymen.

'The divided scrotum contains a gland in each half; the one on the right side is somewhat larger than that on the left; both are about as large as testicles usually are in a well-grown boy of ten or twelve.

'Both glands present the shape of testicles and have an epididymis behind each.

'No sign of menstruation has appeared. The question of sexual appetite was not entered into.

'This is clearly a case of pseudo-hermaphroditismus masculinus internus

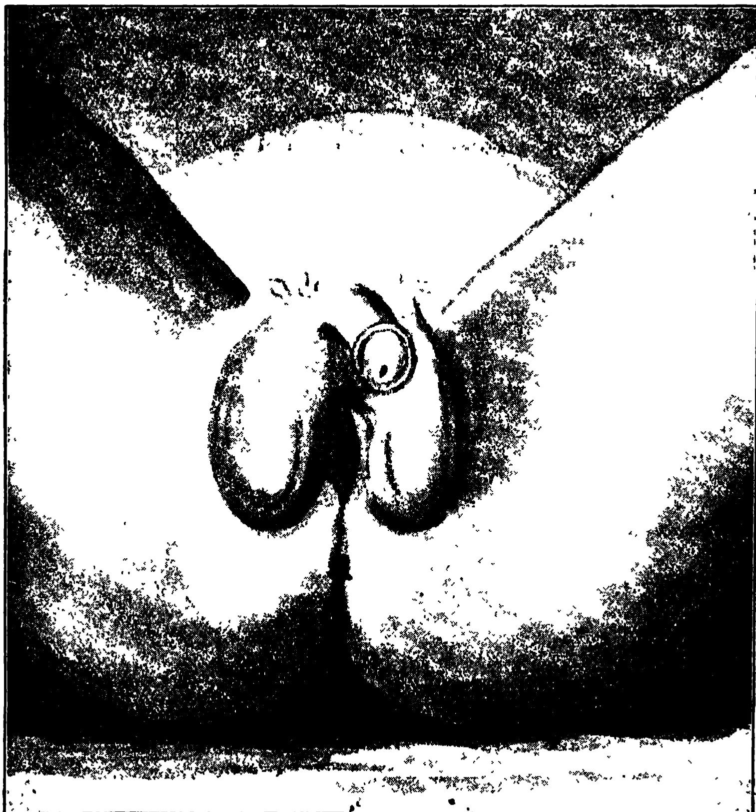


FIG. 545.—CASE OF PSEUDO-HERMAPHRODITISM. (Arthur Maude.)

(to adopt Klebs' classification), with complete and possibly functionally active male genital glands and external organs, side by side with an over-developed uterus masculinus and a patent utero-genital canal.'

The Clitoris.—The clitoris has been attacked by elephantiasis, fibromatous tumours, sarcoma, carcinoma, and cysts.

Cutaneous Affections.

It is not possible in a work of this nature to attempt more than a brief description of some of the more commonly occurring cutaneous affections of the vulva. Cutaneous diseases attacking this part must be regarded as much within the province of the gynæcologist as the dermatologist. Local peculiarities being remembered, they must be treated on general principles and by the local measures we adopt for dealing with similar skin affections elsewhere.

It is my object to deal rather with those affections the clinical characteristics of which are materially influenced by the local anatomical and physiological peculiarities of this part.

Certain general principles must be observed in the treatment of cutaneous vulvar affections.

1. Inquiry into and attention to any predisposing constitutional condition, as, for example, hysteria, gout, struma, diabetes, or scorbutic tendency. Disorders of the urinary organs—cystitis, phosphates and uric acid in the urine—predispose to vulvar inflammation, as they do to vaginitis (see Vaginitis). A history of syphilis must be inquired into if the appearances indicate any specific taint.

2. Scrupulous cleanliness. Alkaline baths, local antiseptic washes of perchloride of mercury, salicylic, boric or carbolic acids, liquor carbonis detergens. Neutral and germicide soaps will be found useful.

3. The correction of any uterine, vaginal, vesical, or urethral affection, which, by an irritating discharge or otherwise, may prolong vulvitis.

Hyperæsthesia.—Gaillard Thomas has drawn special attention to this painful condition. We constantly see patients in whom we cannot detect the least abrasion, vegetation, or irritable caruncle, and yet the introduction of the finger between the labia causes exquisite pain. Hyperæsthesia may attend on irritable urethral caruncle, painful vegetations, or the red patches described by Lawson Tait, and is occasionally met with where we have other manifestations of hysteria. It is the morbid condition most frequently associated with vaginismus. *The treatment* outlined by Thomas is that which I have found of the greatest service. This consists in: 1. Attention to the general health by restoratives and tonics. 2. The application of local sedatives and astringents, such as belladonna, opium or chloroform; painting the dry part with cocaine solution (10 per cent.); bismuth, iodoform, tannin, oxide of

zinc, ichthyol, in the form of ointment; brushing the surface with weak nitrate of silver solution. (See Treatment of Vaginismus.) There must be complete rest from coitus.

Eczema of the vulva in women and young children is often associated with a similar state of the anus and gluteal region by extension. It is occasionally an evidence of a general debilitated condition due to some blood dyscrasia, occurring in lymphatic temperaments, or strumous constitutions; but it is more often due to local irritative discharges, or perhaps pediculi. The eruption is often of the impetiginous character; the part is hot, tender, and smarting. Pustules, vesicles, scabs, and excoriation of the skin and mucous membrane, follow.*

Many leading dermatologists are agreed that eczema of a parasitic origin is specially worthy of remembrance in the case of the vulva, which partakes so largely of the conditions favouring parasitic growth. In fact, Eichoff prefers the name 'dermatitis parasitaria' to eczema, under such circumstances, or to Unna's 'eczema seborrhœicum.'

Treatment.—Any constitutional fault has to be carefully attended to and corrected. The muslin dressing ointments of Unna are admirable applications in such eczematous and other morbid vulvar states. These can be doubled so as to expose a surface of ointment to each labium, and retained thus in the vulva. They may be had of

Lead,
Carbolic acid.
Ichthyol,
Oxide of zinc,
Oxide of zinc and salicylic acid.
Oxide of zinc and thymol,
Thymol,
Boric acid,
Europhen,
Iodoform,
Iodol,
Arsenic,
Belladonna.
Chloral,
Camphor,
Creosote,
and
Mercuric perchloride,
Chrysophanic acid, Resorcin, } For use in the chronic stages of the disease.
Mercury.
Nitrate of silver solution.

* Such a case I had recently—the excoriation extended from above the sacrum behind to the umbilicus in front. It was the most extensive I have ever seen. The patient was ultimately completely cured by curettage of the uterus—attention to the acid urine, ichthyol treatment with arsenic, and local packing with oil and ichthyol cream; Erasmus Wilson's calamine lotion with salicylic acid, and the application finally of nitrate of silver solution, 20 grs. ad ℥i. to the raw and fissured surfaces. (See Treatment of Pruritus.)

Some of the washes already enumerated in the treatment of vaginitis will be found most useful, especially those of zinc and calamine, subacetate of lead, thymol, and sulpho-carbolate of zinc. It is in cases of eczema and pruritus that alkaline bathing and the correction of all acrid vaginal discharges are of such importance. The liquor carbonis detergens lotion, in the drier forms, should be tried.

Lassar's Paste: *
℞. Acidi salicylici, grs. x.
Zinci oxidi, } āā ʒii.
P. amyli }
Vaselini, ʒss.

Ihle's Paste:
Resorcini, grs. x.
Zinci oxi(
P. amyli, } āā ʒii.
Lanolini, }
Vaselini. }

Herpes.—Herpes of the type of H. Zoster is found occasionally following in the course of the pudental nerves. It must not be mistaken for a specific eruption. If a herpetic eruption occur on the vulva, it is an indication for the administration of such tonics as the mineral acids with bark and quinine, generous diet, and a soothing local treatment, as that indicated in the case of eczema. When the vesicles spread, and there is a tendency to pustulation, I find it an admirable plan to brush them over with a solution of nitrate of silver (grs. xxx. ad ℥i.), which is permitted to dry, and then a muslin dressing may be applied. Outside the vulva the zinc (with calamine) lotion is a soothing application.

Pediculi frequently infest the vulva. In cases of eczema and pruritus they should be carefully looked for. It is necessary to use a lens for this purpose. The ammonio-chloride of mercury powder diluted with starch may be lightly dusted on the part, or the ointment of mercury or stavesacre rubbed in, or the perchloride of mercury lotion applied. One part of carbolic acid to seven of oil is a useful application.

Pruritus.—The practitioner must not fall into the error of regarding pruritus as a primary disease rather than as a secondary affection of the vulva. Pruritus must be looked on rather as a neurosis, secondary to some constitutional error of nutrition, or to some local disease in any part of the genital tract. The danger lies in the mistake of treating a symptom and neglecting the disease which originated it. We may thus divide the causes of pruritus of the vulva into constitutional and local.

* Recommended by Graham of Toronto.—*Ann. Universal Med. Sciences*, 1893.

J. C. Webster considers pruritus to be a subacute inflammation of the papillæ of the skin, and a progressive fibrosis of the nerves and Pacinian bodies, especially attacking the clitoris and the upper parts of the labia minora. It is in the main an inflammatory affection of the corium (*vulvitis pruriginosa*). Sänger * considers that the lesion of the nerve-ends is not the primary cause of the pruritus, but a secondary change, resulting from a local affection of the vulva, due to the action of irritants from without. He maintains that there is no proof forthcoming that micro-organisms can induce the skin lesions. It is more probable that their presence is secondary to pre-existing local affections, and if micro-organisms were the primary cause of vulvitis pruriginosa, we should get this affection accompanying all cases of catarrh of the bladder. He subdivides the affection into two great groups:

I. ENDOGENOUS CAUSES.—(1) *Conditions of the blood.* Icterus, chronic nephritis, diabetes mellitus. (2) *Circulatory causes.* Hæmorrhoids, heart disease, pregnancy, retroflexion, and tumours of the uterus (the latter by local obstruction to circulation). (3) *Skin diseases* (of hæmatogenous origin). Erythema, urticaria, herpes, eczema.

II. EXOGENOUS CAUSES.—(1) *Secretory causes.* Hyperidrosis and seborrhœa, vaginal and uterine discharges. (2) *Parasitic causes.* Animal parasites: pediculi, oxyuris vermicularis. Vegetable parasites: leptothrix, oidium albicans, micrococcus uræ. (3) *Mechanical causes.* Masturbation. (4) *Thermal causes.* Spring and summer pruritus.

Treatment.—Sänger, in unusually severe and obstinate cases, removed the diseased parts. The first operation for pruritus was performed by Carrard, in 1874; he removed only the clitoris, but a complete cure resulted. Since then similar operations have been performed by Chrobak, A. R. Simpson, Schroeder, Rheinstädter, Olshausen, and many others. Heitzmann has obtained good results by scraping the affected parts. Sänger in two cases excised the entire clitoris, and the labia majora and minora, and combined with this procedure repair of the perinæum. No difficulty was experienced in closing the wound, and after healing there was practically no visible deformity. Sänger considers that the removal of the clitoris has no effect upon the sexual appetite in women of middle or advanced age. In both of these cases the sufferings of the patient disappeared from the day the operation was performed. Sänger lays down the following propositions:—

(1) The partial or complete excision of the vulva is a legitimate operation,

* *Centralblatt für Gynäkologie*, February, 1894.

which ought to be performed in chronic cases of vulvitis pruriginosa, which have resisted other methods of treatment.

(2) The clitoris may be removed without harm in all but young women.

(3) In young women, and in cases where the symptoms are localized to a part of the vulva, only the diseased portions should be removed.

(4) In older women, and when the vulva is extensively affected, the entire vulva should be removed, and the parts restored by plastic methods.

It may be rightly objected that many of these local causes enumerated in the text only cause severe itching, not *true* pruritis. For clinical purposes I here group these incidental and often associated conditions in the consideration of pruritus generally.

Constitutional:

Gout.
Diabetes.
Gonorrhœa.
Exanthemata.
The menopause.
Pregnancy.
Senile changes.
Hysteria.
Bright's disease.
Alcoholism.
Gastric and hepatic derangements.
(Of these, diabetes, alcoholism, pregnancy, and gastric derangements are the most frequent.)

Local:

Eczema.
Lichen.
Leucorrhœal discharges.
Gonorrhœal „
Flow of diabetic urine.
Cystitis.
Vulvitis.
Vaginitis.
Ascarides.
Pediculi.
Vegetations.
Urinary fistulæ.
Hæmorrhoids.
Uncleanliness.

In many severe cases of pruritus there is a total absence of all organic change in the skin, and the irritation is due to a derangement of the stomach, liver, or rectum. In a great many instances, however, the excoriation and accompanying eruption are secondary consequences of some irritating discharge, and the tearing of the skin by the nail in scratching.

Intractable Pruritus with Vaginismus, and Dyspareunia associated with Fissure of the Vaginal Fourchette and Uterine Erosion—Cure by Operation.

I have just passed a patient through my hands cured, who had suffered for some years with intractable pruritus, and for some considerable time from such a degree of dyspareunia that the pain prevented all marital relationships.

On examination I found that there was a vaginal discharge with a slight cervical erosion. The vulva was dotted over with aphthous patches and some erosions. Extending back through the fourchette, for about half an inch, was a fissure, which she said had lasted for some time. There was a general condition of vaginismus, and the parts were intensely sensitive. Her misery, however, appeared to entirely centre itself in the pruritus, which was influencing her health from constant irritation and sleeplessness. The whole vulva was shaved, and thoroughly disinfected. The uterus was curetted out, and chromic acid applied to the cavity. The erosion of the cervix was treated with nitric acid. The spots on the vulva were all touched with carbolic acid. By an elliptical incision from side to side, the fissure was exsected, and the vaginal orifice enlarged. The entire area of the itching surface was well rubbed with pure carbolic acid. This application was repeated a second time. The vagina was tamponned with chinosol gauze, and for a week subsequently the urine was carefully drawn off, and the closest attention paid to the cleanliness both of the vagina and vulva. The patient left the Home completely cured of the itching, and bearing the introduction of the largest vaginal dilator without distress.

Treatment.—The practitioner, on first seeing the case of pruritus, should inquire carefully into the origin and history of the disease. His success in overcoming the obstinate, and at times intractable, itching will depend on the discovery of the cause, whether constitutional or local, which has brought on the pruritus. Gouty and diabetic states must be dealt with according to general principles, both therapeutical and dietetic; the character of the urine should be ascertained, and any abnormal condition of this secretion rectified as far as possible. The diet has to be carefully regulated. Alcohol, according to circumstances, should either altogether be forbidden or taken in the most moderate quantity. Sufferers from pruritus should avoid too stimulating a diet. Tea and coffee must only be taken in moderation. Saccharin in diabetic and gouty cases is a most valuable substitute for the ordinary carbo-hydrate sugar. Food should be simple and plainly cooked. Pastry, fats, rich soups, sweets, cheese, shell-fish, saccharine vegetables, and fermented drinks, should be avoided.

In hepatic derangement, the administration of a mild mercurial preparation a few times in the week at night, in combination with a vegetable cholagogue, followed by the administration of a saline water the next morning, such as Rubinat, Hunyadi Janos, or Victoria water, will be of service. The Carlsbad salt in powder or crystal, dissolved in warm water, is beneficial. Such spas as those at Vals, Vichy, Vittel, Contrexéville, Ems, Homburg, Carlsbad, Kissingen, Bourboule, Aix-les-Bains, Harrogate, Bath,

Cheltenham, Strathpeffer, can be recommended according to the type of case. During pregnancy the patient may take suitable soothing baths, and use such local remedies as some of those in the subjoined list. The leucorrhœal discharge of pregnancy should be attended to. If there be constitutional syphilis, it must be dealt with by specific remedies, both general and local. Arsenic will be found of service in many cases.

Kraurosis Vulvæ.—Briesky, Orthmann, Martin, and Sänger are the principal authors to whom we owe our knowledge of this affection. It does not appear to have any microbial origin, nor is it associated with any venereal affection. The nerve-ends are not changed as in pruritus. It is a question, according to Sänger, if it be not a form of atrophic change in the vulva, preceded by an inflammatory state. It is not peculiar to women of any age, nor has married life anything to say to it.

Symptoms.—There is usually itching, but this symptom is not invariably present, being absent when there are serious atrophic changes in the nerves. The swelling and feeling of tension are followed by fissures, and subsequently atrophic changes in the tissues of both labia and the clitoris.

Local Treatment of Pruritus.—The first care of the physician will be to endeavour to rectify any uterine, vesical, or rectal affection that may complicate the pruritus.

Much benefit will be derived, in some cases, from the use of soothing alkaline and starch baths. But to this there are exceptions; and baths occasionally appear to do more harm than good.

The three baths I prefer are:

1. Bran (2 lb.), potato-starch b.), gelatine (1 lb.); water at 100°—105°, 25 to 30 gallons.

To this a few gallons of decoction of marsh-mallow may be added. The bran and marsh-mallow water can be first prepared, and added to the bath subsequently.

2. Carbonate of sodium (℥ii.), hyposulphite of sodium (℥ii.), potato starch (℥iv.); water at 100°—105°, 25 to 30 gallons.
3. Liq. carbonis detergens (Wright's), ℥i.—℥ii. to the gallon.

In ordering any *hot* bath for a female patient, the periods must be remembered, and their regularity inquired into. *If there be suppression of the menstrual flow and accompanying head-symptoms, such as headache, disturbances of vision, or tinnitus aurium, hot baths should not be taken.* Such soaps as larch-soap (W. Moore, of Dublin)—which is composed of wheaten bran, glycerine, white curd soap, and extract of larch-bark—sulpholine soap, molfa (Dinneford), vinolia, and carbolic or tar soap, may be used with the bath. A

glycerine or medicated tampon, or pessary, can be introduced after the bath. (The bath speculum is shown at p. 69.) The vaginal rest may be worn, and the lips of the vulva separated by a piece of folded linen or cotton-wool, smeared over with any sedative ointment, or the muslin ointments before referred to can be prescribed, and these may be kept in position by a light perinæal bandage or a napkin.

The local remedies which will be found of use either in washes or ointments to allay *itching* have been already enumerated. Those I attach most value to are:

In lotion—

Hydrocyanic acid (min. v.—℥i.).
Perchloride of mercury (1 in 2,000—1 in 5,000).
Tobacco, as infusion (ʒi.—Oi.).
Solution of subacetate of lead (ʒii.—℥x.).
Chloral (gr. x. ad ℥i.).
Cocaine (5—10 per cent. solution).
Chloroform (1 pt. to 7 of oil).
Menthol (1 pt. to 7 of oil).
Liq. carbonis detergens (ʒi.—℥viii.).
Ext. hamamelis liq. (℥i. in ℥viii.).
Walnut leaves (decoction of).
Calomel (lotio nigra).

In ointment—

Salicylic acid (grs. xx. ad ℥i.).
Pyroligneous oil (ʒi. ad ℥i.).
Cyanide of potassium (gr. ii.—gr. v. ad ℥i.).
Morphia (gr. v. ad ℥i.).
Cocaine (gr. xx. ad ℥i.).
Belladonna (gr. x.—xx. ad ℥i.).
Oleate of mercury and morphia (lanolated).

Neisser strongly recommends *tumenol* as anti-pruritic in eczematous states and in prurigo. He uses the remedy either as a paste (5–10 per cent. of the powder with starch) or as an ointment. He gives this form (*Deutsche Medicinische Wochenschrift*, Leipzig, November 5, 1891):

℞ Tumenol, ʒii. ss.—v.
Pulv. zinci oxide, āā ʒii. ss.
Bismuth salint ungt. linepæan, ʒvi. (*Lib. cit.*)

Many of these remedies must be used with caution, especially if there be abraded surfaces, as, for instance, cocaine, perchloride of mercury, belladonna, cyanide of potassium, morphia, hydrocyanic acid. The exact quantity to be applied should be stated in the prescription.

For the itching of diabetes Goodell strongly recommends the salicylate of sodium, in 15-grain doses, every fourth hour (Simpson, Philadelphia). Bromides and chloral, trional, sulphonal, chloralamid or urethrane may be given to secure rest and sleep.

The following astringent and antiseptic applications will also be found most valuable in various cutaneous affections of the vulva in the strengths indicated.

Oxide of zinc }
Calamine } (℥ss.—℥viii.).
Biborate of sodium (ʒii.—℥viii.).
Carbonate of sodium (ʒii.—℥viii.).
Acetate of lead (gr. ii.—gr. iv.—℥i.).
Solution of the subacetate of lead (ʒii.—℥viii.).
Sozo-iodolate of sodium (ʒii. in ℥viii.).
Sulpho-carbolate of zinc (gr. iv.—℥i.).
Thymol (1 in 500 to 1 in 1,000).
Chaulmaugra oil with almond oil.
Camphor and borax (liq. camphor. concent. ʒii., borax ʒiv., in ℥viii., with or without glycerine).
Nitrate of silver (gr. xxx.—ʒi. ad ℥i.).
Carbolic acid (gr. xxx.—ʒi. ad ℥i., or equal parts of carbolic and glycerine).
Chromic acid (gr. xxx. ad ℥i.).
Chloride of zinc (gr. xxx.—ʒi. ad ℥i.).

And as ointments—

Benzoate of zinc (ʒi.—℥i.).
Oxide of zinc (ʒi.—℥i.).
Chloroxide of bismuth (ʒii.—℥i.). These may be combined.
Glycerole of lead (ʒi.—℥i.).
Oleates of lead and zinc (ʒss.—℥i.).
Sozo-iodol (ʒi. ad ℥i.).
Iodol (ʒss.—ʒi. ad ℥ii.).
Iodoform (disguised with fresh coffee, equal parts, vanillin or coumarin, gr. v.) (ʒss.—ʒi. ad ℥i.).
Pyroligneous oil of juniper (alone or in combination, varying strengths).

The use of any of the remedies here enumerated, whether alone or in combination, will depend on the *nature* of the eruption, its *stage*, and the indication for a soothing, astringent, stimulating, or detergent application. It is wrong to commence with too powerful an application. Better, in most instances, to begin with a mild lotion, and increase its strength according to the toleration of the part.

Where there is a raw or moist surface of the skin the lotion of zinc and calamine (Wilson) will be found most useful. To this either carbolic acid,

or thymol, or hydrocyanic acid may be added. It can be used with a fine sponge. The powder dries, and can be washed off before fresh lotion is applied.

℞ Zinci oxidi, ʒii.
Calamine pur., ʒiv.
Glycerine, ʒii.
Aq. rosæ, ℥viii. Ft. lotio.

℞ Solutio ichthyol (10 per cent.), ʒiv.
Ol. Chaulmaugræ, ʒii.
Lanolini, ℥i.
Aq. rosæ, ʒi.
Ung. benzoat, ʒiv.

The ointment to be applied to the part after the alkaline or tar bath. The latter for a full bath is made of the strength of ʒi.—ʒii. of the liquor carbonis detergens to the gallon of warm water.

When the inner surfaces of the labia or nymphæ are sore or swollen they should be separated by some emollient dressing—the muslin dressing of Unna may be used– or a piece of linen can be folded and placed between them, or cotton-wool. The linen or wool can be covered with any application we may wish to employ.

Local Syphilitic Remedies.

These are the more useful specific applications if the pruritus be associated with syphilis—

Calomel wash.
Oleate of mercury and morphia.
Calomel vapour baths.
Iodoform insufflated.
Sozo-iodol and its salts (ointment or wash).
Iodoform ointment.
Europhen.
Iodol insufflated.
Vasol iodine.
Iodol ointment.
Mercurial (mild) ointment.
Ointment of calomel with bismuth.
Iodide of starch (ointment and powder).
Picis liquid. (ʒi.—ʒii. ad. ℥i.).
Extract of belladonna (ʒi.—℥i.).
Cyanide of potassium (gr. iii.—℥i.).

All these may be made with lanolin. A lanolated ointment is more readily and completely absorbed by the skin. As a rule, it is sufficient to add one part of fresh lard to two of lanolin, with a little rosewater as a basis for the ointment.

Lupus.—Certain chronic, painless, hypertrophic states of the vulva, without infection of the neighbouring glands, yet liable to various degrees of ulceration, have been described by Duncan, Huguier, and others as lupus. Thin, from his pathological examination of some growths submitted to him by Duncan, supports this view, pointing out, however, that the microscopic appearances are quite different from those found in lupus vulgaris. There was small cell infiltration beneath the epithelium, and bloodvessels ran straight to this part. Fibrous tissue was found in all stages of development.

To this same condition of the vulva the term *esthiomene* (ἐσθίω, 'to eat') has been given by Huguier. This term has been loosely used for a variety of serpiginous and ulcerative conditions. As, for instance, to a recurring malignant ulceration on the lower extremities, and to what is known as the 'menstrual ulcer' occurring in women. Its original application to the rare condition *lupus exedens* of the genitals in all probability accounts for its recent adoption in these asserted lupoid conditions of the vulva. Hutchinson and Malcolm Morris doubt the accuracy of Duncan's view, and rather regard these cases as having a syphilitic origin. I have met one such typical case as those described by Duncan. I clearly traced a syphilitic history. Shaving away the growth, I used Paquelin's thermo-cautery, and the part healed. This appears to be the best treatment, attended, if there be evidence of syphilitic taint, by specific constitutional measures.

Tubercular disease of the vulva is extremely rare. Kelly reports a case in which after excision of the diseased area, which included the greater part of the external genitals, he covered the parts by flaps taken from the vaginal wall, and restored the urethral orifice which had been involved in the disease.

Oozing Papillomatous Tumour.—I have seen one case of this rather rare affection, presenting exactly the clinical features described by Emmet under this name. The woman, about thirty, was unmarried. There sprouted from one labium, extending round the fourchette to the other, a large red raspberry-looking mass, bleeding rather profusely on examination, painless, and secreting an offensive discharge. It was a most characteristic growth, and had grown to a large size before the patient came into the hospital. An effort was made with ligature and cautery to remove it, but the hæmorrhage was so great it was not possible to proceed. I do not know what the sequel of the case was. Emmet's reported case recovered, though here also there was alarming bleeding.

Rodent Ulcer.—This very rare form of malignant disease does not differ, save in so far as it is influenced by the anatomical site in which it occurs, from the same disease elsewhere, and may be considered an epithelioma. The treatment is conducted on the same principles

which determine us in the management of rodent ulceration occurring in other situations. If by the hard base and slow progress, tubercular appearance, and absence of pain, we should be able to recognize the disease early and before ulceration has extended widely or deeply, we may prevent the spread of the growth by the knife and caustics, the most powerful of the latter being potassa fusa, chloride of zinc, and nitric acid. We must be careful to distinguish it from syphilitic ulceration, and from what few are likely to see in a lifetime—so-called 'lupus of the vulva.'

Cancer of the labium is not a common disease. The form in which it is most frequently met with is that of cancroid. Epitheliomatous nodules may exist for some time, and give rise to little pain. It is not until ulceration commences that much uneasiness is felt. The inguinal glands become involved. It is difficult, save by careful microscopical examination, to distinguish such nodules from syphilitic neoplasms, or the so-called 'lupus.' Kelly reports a case of adeno-carcinoma of the vulvo-vaginal gland.

Treatment.—If superficial, it is better to remove the mass with the knife and use the actual cautery to the raw surface. Hæmorrhage is always to be dreaded. Should it occur, powerful styptics or the actual cautery, and a firm compress applied with a bandage, will be necessary. But despite all our efforts, in advanced cases, fatal bleeding may result.

Syphilis.—Care has to be taken in searching for, and the recognition of, primary syphilitic sores. They frequently are seen on the opposing surfaces of the mucous membrane. They are either true chancres, chancroid sores, or they may assume the sloughing or phagedenic type. Chancres are also found on the perinæum and anus.

Secondary syphilitic eruptions are frequently met with about the labia and perinæum, extending to the anus and gluteal folds.

Evidences of Syphilitic Infection.

It may be well here to append a short table of the principal signs on which we rely as collateral evidence of constitutional syphilis—

Granular enlargements in the groins.	Condylomata, syphilitic vegetations, and warts on the labia.
Symmetrical skin affections, as maculæ, papules, or roseola.	Palmar syphiloderm.
Symmetrical throat eruptions and ulcers.	Syphilitic changes in the nails.
	Falling out of the hair.

Nodes.
Ozæna.
General discolouration of the skin.
White cicatrices and scars on the body.
Iritis and retinitis.
Stricture of the rectum.
Gummata, sores, fissures, and ulcers of the tongue.
Frequent abortions and miscarriages.
Nasal and naso-pharyngeal discharges attended with ulceration of the mucous membrane or perforation of the septum nasi.

In the treatment of primary sores, the vulva should be frequently dressed with subchloride of mercury lotion, and washed with perchloride occasionally. At night an iodol, vasol iodine, or iodide of starch ointment may be used, or whatever muslin dressing is selected. The best method of administering mercury is by inunction or hypodermic injection. The mercury may be given up to the point of its therapeutical manifestation, which is watched through its effect on the gums, and its use must always be carefully supervised.

In many cases of secondary and tertiary affection I give the tannate of mercury in gr. ss.—gr. i. doses, either alone or combined with quinine, or with quinine and arsenic, with excellent results.

In secondary syphilitic neoplasms and exanthems in women, I know of no safer or better preparation of mercury than the bicyanide in combination with quinine in pill, as already advised (gr. $\frac{1}{12}$, carefully divided, three times in the day).

℞ Acid. arseniosi, gr. $\frac{1}{36}$.
Hyd. bicyanidi, gr. $\frac{1}{12}$.
Quinæ sulph., gr. i.
Ext. gent., q.s.
Misce panis. Ft. pil.

During its administration, the iodides of sodium and potassium may be taken in full doses.

Iodoform (in gr. i.—gr. ii. doses, in pill, three times daily), when it can be borne, acts more quickly. The mixture of the iodides of sodium, potassium, and ammonium in combination with bark is an admirable one. Iodide of potassium should always be given freely diluted with water, to avoid iodism. Women suffering from specific affections require plenty of light nourishing food, change of air, and a continuance of anti-syphilitic remedies for some time. Mercury, whether by vapour or inunction, should be administered with great care, and it is a good plan to omit its administration from time to time, never pushing its therapeutical effects to the limit of salivation. As local applications to syphilitic sores, to clean their surfaces, and to encourage healing, iodoform, iodol, and iodide of starch (in the form of ointments) are excellent preparations. For

sores about the anus, black oxide of mercury lotion, bismuth and calomel ointment, and calomel fumigation are most useful. So is light touching with a pencil of sulphate of copper.

Especially during the secondary and tertiary stages (the 'exanthem period' of syphilis), a sojourn at Aix-la-Chapelle for at least from five to six weeks, is the best treatment. The treatment consists mainly in a graduated course of mercurial inunction under skilled rubbers, with baths, or, in severe cases, mercurial subcutaneous injections. The diet, bathing, exercise, and friction are all carefully regulated. I have never sent a syphilitic case to Aachen that was not greatly benefited if the course were sufficiently long.

Simple Vulvitis.—This affection is the result frequently of want of cleanliness, deficient food and exposure, violent coitus, pruritus, and the consequent rubbing to allay the itching. In children it is produced from the same causes, and is occasionally due to the irritation of threadworms. In simple vulvitis there are swelling, heat, irritation, and a leucorrhœal vulvar discharge of mucus, epithelium, and pus.

Purulent Vulvitis.—This is a much more serious form of inflammation. The preliminary symptoms are all intensified, and are followed by a copious discharge of pus. If the labia be separated the mucous membrane will be found in parts excoriated or ulcerated, and in some instances patches of diphtheritic membrane are seen on the mucous surface.

Causation.—It is brought on by *want of cleanliness, traumatic causes, gonorrhœa, excessive venery*, and is associated with *vaginitis and vaginismus, pruritus, vulvar eruptions (as eczema), fissure of the vulva, the exanthemata.*

Symptoms.—Besides the ordinary symptoms of vulvitis there are frequently most severe pruritus, constant micturition and scalding, with an inflamed meatus urinarius. The discharge has an unpleasant odour. Cystitis may arise. The treatment must be conducted on the lines laid down for the cure of vaginitis, both simple and specific. This includes rest; fomentations; baths; warm opium and acetate of lead lotions; poultices; mild astringent and sedative applications when the acute stage has passed; an emollient ointment used to separate the nymphæ. Later on, any raw surface is painted with a mild nitrate of silver solution, and an antiseptic and stimulating lotion of carbolic acid, boracic acid, sulpho-carbolate of zinc, thymol, etc.

Follicular Inflammation.—In this variety of vulvitis the various

glands—muciparous, sebaceous, and other—of the mucous membrane of the vulva are swollen and inflamed. This follicular distension often leads to furunculus. The minute boils recur. At times this recurrence of the furunculous abscess is most distressing to the patient. No sooner is one evacuated than another appears. The boils vary in size. Recently I was consulted by a patient who had had a constant recurrence of such furunculi for a period of six months. The swelling may involve the entire labium of one side. The uterine-cervical follicles may also be found swollen and suppurating.

Causes.—It is sometimes associated with the leucorrhœa of pregnancy; otherwise the causes operating in producing follicular vulvitis are much the same as those which induce simple vulvitis. (See Vaginitis.)

Symptoms and Signs.—The same itching and sense of burning heat, with extreme sensitiveness of the vulva, that are present in other forms of vulvitis, mark the presence of the follicular varieties. Both the muciparous follicles and the sebaceous glands can be detected enlarged; the former in patches, the latter as congested papillæ. There is considerable pain attending the formation of each fresh tiny boil. If they assume a large size, the suffering is great in this sensitive part. The patient also falls off in her general health; she cannot take exercise, and the appetite is affected. A most important feature of this inflammation must be remembered by the practitioner, that it is liable to cause urethritis in the male, and thereby give rise to a suspicion of unchastity in the mind of a husband.

Treatment.—It is well to remember the recurrent nature of folliculitis. This is due to auto-inoculation and the dissemination of the micrococcus after the bursting or evacuation of the suppurated follicle. The urine should be examined for any sources of irritation; it will be found at times glycosuric, and in the vulva, as elsewhere, this saccharine state of the blood tends to promote fermentative action and the development of microbal life. The uterus is attended to, and any cervical or vaginal discharges cured. The perchloride of mercury (1 in 5000) in a vaginal douche may be used a few times in the day. Alkaline douches of carbonate and borate of soda are soothing. A lotion of eau de Cologne in rose-water (℥i. in ℥viii.), with dilute hydrocyanic acid, will be found very grateful if there be heat and irritation of the vulva. The part is first well sponged with warm water containing one drachm to the gallon of liquor carbonis detergens; next it is thoroughly dried, and

the eau de Cologne wash is then applied. At night an ichthyol cream is smeared over the vulva. Any suppurating follicles should be laid open with a knife. If a vulvar abscess forms it is freely incised.

Phlegmonous Inflammation of the Labia.—When from any cause we find that one labium has become enlarged, tense, hard, painful, and very tender, we may suspect phlegmonous inflammation. The effusion is generally followed by the formation of pus and an abscess. After opening a large vulvar abscess the practitioner should carefully see that it heals well from the bottom of the wound, nor should the patient be allowed from under observation until it has so healed. Otherwise a sinus is apt to remain, which will require subsequent free slitting open with the knife, and seriously protract the recovery of the case. We must treat it on the general principles of relieving pain, promoting the formation and the free evacuation of pus. Care must be exercised not to mistake phlegmonous inflammation for a hernia, hydrocele, or pudendal hæmatocele. That an ovary may be displaced into the vulva, we have seen. We must not commit the pardonable error of mistaking such an inflamed ovary for phlegmon. The presence of a circumscribed tumour in either labium, which becomes periodically sensitive and very painful—this increase of sensitiveness corresponding with the menstrual periods—should be sufficient to remind us that an ovary may find its way into the labium.

Abscess of the Vulvo-Vaginal Glands.—This affection of the vulva and its treatment has already been incidentally alluded to (p. 3). The position of the tense, hard, painful swelling, frequently attended by a certain degree of vulvitis, and its sudden advent, should be sufficient indication of the nature of the inflammation.

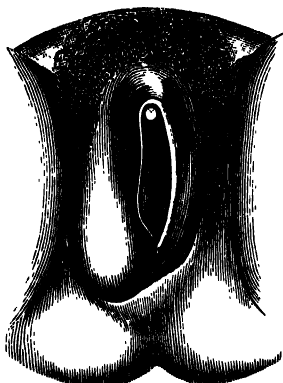


Fig. 546.—Abscess of the Bartholinian Gland. (Huguier.)

Kelly describes (*Operative Gynæcology*) an inguino-labial abscess; it occurred in a mulatto, and involved both inguinal canal and the labium.

Gangrene — Noma. — This serious affection is not, fortunately, of frequent occurrence. Yet I have seen one instance in which death occurred, not so much from the ravages made by the local gangrene as the cachectic

weakened state of the child. I have never seen it in an adult. The predisposing causes are such as we find producing low and unhealthy types of inflammation in the body, notably cancrum oris, and those sloughing ecthymatous sores frequently seen in impoverished and dirty children. If not checked, the course of disease is that of unhealthy ulceration when attended by mortification generally. The *treatment* consists in generous support of the child, and the application of such disinfectants as peroxide of hydrogen, permanganate of potash, carbolic acid, chloride of zinc, iodoform. Poultices should be avoided. If any be used, those of charcoal, and yeast with nitric acid, are perhaps the best. The usual means adopted to prevent the spread of mortification must be had resort to in this case, as the application of nitric acid, pure carbolic acid, and the actual cautery.

Diphtheritic Vulvitis.—Whitridge Williams, in drawing attention to the presence of diphtheritic vaginitis or endometritis, has shown how rarely in these cases the peculiar grayish white membranes formed on the inner surface of the labia contain the typical Klebs-Löffler bacillus. Such membranes are more frequently due to streptococci. Antitoxin and local germicides are indicated as the special treatment.

Warts and Vegetations.—These growths occur in different situations around the vulvar orifice. They are frequently the result of gonorrhœa or syphilis. This, however, is by no means the rule. I have seen in a virgin, suffering from leucorrhœal discharge, two fairly large vegetations growing from the neighbourhood of the clitoris.



FIG. 547.—VEGETATION OF THE VULVA. (Tarnier.)

Herpes Vegetans of the Vulva.—Bataille exhibited a case at the 'Société de Dermatologie et de Syphiligraphie' in which there was no history of acquired or hereditary syphilis. Following a foul discharge from the vagina and general symptoms of pyrexia, there was an eruption of *herpetic vesicles*, which spread from the groin to the vulva, and to the anal fold. The swollen vulva was covered with vascular erosions, which had in parts a diphtheroid appearance,

so much so as to give to the erosion a chancriform look. One of these erosions was at the orifice of the urethra. The cervix uteri was swollen and red, the lips were everted, and there was a muco-purulent secretion from the uterus, vesicles were seen on the tonsils, and the sub-mental ganglia were enlarged. After successive formations of vesicles had occurred, the ulcerations in healing developed hypertropic vegetations in masses of violaceous red colour, with bleeding surfaces, resembling syphilitic ulcers, most difficult to diagnose from the latter (Fournier). The possible occurrence of such suspicious vegetations on the vulva, without any syphilitic history to connect them with specific infection, is worth remembering.*

The growths are removed by the scissors and galvano-cautery. If the wart be of large size, a ligature is applied to its base or pedicle a few days before removal. We thus avoid the chance of hæmorrhage, which otherwise may be inconvenient. Such warts should never be cut off carelessly without means at hand to restrain the bleeding that may follow. I have destroyed these vegetations without any cutting operation, by means of the repeated and careful application of acid nitrate of mercury, chromic acid, or glacial acetic acid. In aggravated cases it may be necessary to apply Paquelin's cautery after the removal of the growth with a cutting instrument.

Transplantation Operation for Recurrent Vegetations of the Vulva.—In a case of extensive recurring vegetations of the vulva, I was present at the University Frauen Klinik in Berlin when Coblanck cleanly dissected off the mass, leaving a large raw oval surface, some three and a half inches in length, and close on three inches wide. As it was impossible to cover the surface by adjustment of the edges, a long incision was carried from the pubes to the spinous process of the ileum, the skin was raised, and the glands and subcutaneous tissue were carefully dissected out. The denuded surface was contracted by two layers of gut sutures, passed deeply and superficially through the tissues, the raised skin was then glided over the raw surface, fixed there by sutures, and the margins of the wound in the groin were brought together. A small drainage-tube was inserted. The patient did remarkably well.

Trachoma Pudendorum.—Tarnovsky has described a true trachoma of the labia. The disease consists in the aggregation of nodules of a grayish or yellowish colour. These may coalesce and form an oval

* *Annals de Dermatologie et de Syphiligraphie*, Paris, p. 298; *Annual of Universal Medical Science*, 1893.

patch, the epithelium covering of which thickens and becomes rough. The nodules contain micrococci and epithelial cells. This condition is more likely to be found in those who have been exposed to gonorrhœal infection. It causes, especially with warmth at night, intense itching of the vulva, and a sense of heat.

The *treatment* consists in superficial scarification of the trachomatous patch, and the use of such lotions as those of perchloride of mercury (1 in 2000), nitrate of silver (5—10 gr. to ℥i.), or chromic acid (10 gr. to ℥i.).

Cysts of the Labia.—Cysts of the labia are not frequently met with, if we exclude cysts of the vulvo-vaginal gland. In dealing with a cyst, the plan is not different to that which we pursue in the case of the vulvo-vaginal variety. After thorough asepsis of the parts has been secured, and the tumour has been made tense by pressure, an incision is carried through the skin surface over the whole length of the tumour, down to its wall. This having been carefully exposed, the dissection is carried close to it with a blunt-pointed bistoury, a flat curved scissors, aided by the handle of the knife or finger, and the cyst is thus carefully isolated, great care being taken not to rupture it. This will be certain to be done if the point of the knife is directed to the sac, or it is grasped roughly with forceps. Both time and patience are required to effect this little operation neatly, and without the risk of subsequent hæmorrhage. Some years since I dissected out a large vulvo-vaginal cyst, which had assumed the size of a pigeon's egg. I left the patient, as I thought, securely protected from all risk of hæmorrhage, but found I was mistaken. I was called at night, as a very large hæmatomatous tumour had formed in the vulva, and there had been considerable bleeding through the bandages. In this case, at night, I had to turn out the clots which had fallen into the cavity as best I could, and secure the bleeding-points with ligatures. The patient, however, did well. It was a lesson to me not to finally put up any case of ablated vulva cyst until it was perfectly certain that all chance of secondary hæmorrhage was prevented. In all operations of this nature, I prefer a general anæsthetic to cocaine. If the cyst has suppurated, it may be best to evacuate the contents by running a bistoury through the entire length of the sac wall, clearing out the cavity well, and having scraped and dried it, wiping the internal surface dry, and then mopping it out with either strong iodine or carbolic acid solution, after which it is filled with a strip of iodoform gauze, and this packing is repeated while there is any

suppuration, and until the cavity has finally granulated. In all instances, however, when feasible, extirpation of the cyst is the proper plan to adopt.

Blood Cyst of the Labium.—I was recently consulted by an unmarried lady for a small cystic tumour in the right labium, about the size of a large hazel nut. It had commenced to give her some pain and distress. I extirpated it intact, and on opening it found that the contents were pure blood. It was the only blood cyst of the kind I had ever met with.

Varix of the pudendal veins is generally the result of pregnancy. The danger is rupture of a vessel and serious hæmorrhage. A suitable air-pad support will be found useful in these cases. If hæmorrhage should occur, the usual means must be taken to control it.

Pudendal Hæmatoma (wrongly called thrombus).—Blood may pour in quantity from the labia in consequence of puncture or laceration of the veins of the vestibule, or it may accumulate in the cellular tissue of the labium. This accident is one which may occur during parturition. Independently of pregnancy, it may follow from traumatic causes or violent muscular efforts. The sudden appearance of a swelling in either labium, following the injury or strain, and the sense of throbbing and pain which generally succeeds, are in themselves sufficient to indicate what the nature of the accident is. However, cases occur in which the attention is first attracted by the presence of a tumour, and the obstruction it causes to micturition or coitus.

Treatment.—If the vulva be bleeding from a wound, a tampon must be placed in the vagina, and a firm compress with a T-bandage secured externally. This may be made to include a small ice-bag. A saturated solution of alum may be kept to the bleeding part. An acupressure pin, or a silver suture, can be passed from the cutaneous to the mucous surface, so as to compress the bleeding vessel (Goodell). If a hæmatoma should form after the removal of a cyst from the vulva from secondary hæmorrhage, the sutures should be at once removed, the clots turned out, and the bleeding points secured by forcipressure or gut ligature. When blood is effused into the cellular tissue, and a tumour forms in the labium, it may be (1) absorbed, or (2) remain in a liquid state, or (3) suppuration may occur. Rest, pressure, and cold will generally favour absorption. Should this not happen, and inflammation and suppuration follow, the pus must be evacuated, and any coagula

removed by an incision made from the mucous surface with every antiseptic precaution.

Elephantiasis.

This disease rarely occurs in Europe. The growth is a chronic hyperplasia of the skin and cellular tissue, consequent upon an inflammable œdema, which is characteristic. Ultimately a neoplastic growth forms, which is developed into fibrous tissue. The surface of the skin finally becomes thick and scaly, from changes in its papillary and epidermic layers. Pye Smith describes a section of the affected skin as made up of massive fibrous bands of white and elastic tissue, with œdematous, connective, and adipose tissue, while the lymph spaces are enlarged and the lymphatics are dilated and varicose, consequent upon the absorption of the lymphatics.

These changes are frequently associated with the presence of the parasite *Filaria sanguinis* (*Filario Bancrofti*).

Labourand has drawn attention to the attacks of lymphangitis and fever which periodically occur during the invasion of the connective tissue and lymph spaces of microbes (strepto-coccus of Fehleisen), associating it with the lymphangitis of syphilis. This indicates the importance of asepsis in the treatment of the disease (*lib. cit.*).

Appearance, Symptoms, and Diagnosis.—The characteristic swelling and thickness of the skin over the perinæum and vulva, with the large tumours that subsequently are formed, afford sufficient evidence of the nature of the disease. The friction of the opposite lips may lead to ulceration, and occasionally vegetations are found, due to papillary hypertrophy. The tumid parts may be attacked with erysipelas, when there will be the usual symptoms of this affection.

Treatment.—The sole treatment is ablation, in which special attention has to be paid to the control of hæmorrhage. If it be possible to operate in the female, the elastic ligature and clamp should be



Fig. 348.—Elephantiasis of the Vulva. (Pozzi.)

availed of. The galvano-cautery loop may also be used. Every care must be taken to prevent sepsis or suppuration; and it must be remembered that the earlier this operation is performed the better, when it is clear that the disease is progressing, unless it be contra-indicated by such conditions as albuminuria, anæmia, dysentery, or tumours of the uterine tissue.

Tumours, sarcomatous, carcinomatous, fibromatous, and lipomatous, are found growing from the labium, nymphæ, hymen, and clitoris. Perhaps the most commonly met with are the lipomata. These growths present the usual characters of lipoma elsewhere. If small, they might be mistaken for hernia, but they are not reducible. They are round in shape, somewhat soft, and give a sense of fluctuation. They are frequently pedunculated. There is no difficulty in their removal. Should they involve the inguinal canal, and extend into the vaginal, they must be carefully enucleated, and the bleeding checked by forcipressure.

Hernia of either the ovary or intestine may occur into the labium.* Its descent by the unobliterated canal of Nuck is analogous to the corresponding descent of the intestine in inguinal hernia in the male. The bowel can generally be reduced in the recumbent posture by taxis, but it may become strangulated. The possibility of this accident must be remembered by the surgeon before he takes up a lancet to open an assumed abscess or cyst of the labium (see chapter on Diseases of the Ovaries). Koppe has described cysts of the round ligament as liable to be mistaken for hernia. These cysts may be due either to effusion of blood in unobliterated canals in the ligament, or to distension of the vaginal process of the peritoneum, the inguinal portion being obliterated. Such cysts are apt to be mistaken for cystic distention of the vulvo-vaginal gland.

Hydrocele, or an accumulation of fluid in the canal of Nuck, is of such rare occurrence that we need not here consider its pathology in detail. It may be sacculated if the abdominal opening of the canal be closed : otherwise the fluid can be pressed out of its sac. It is well, however, to remember the possibility of such a condition existing, and not to commit the error of mistaking it for hernia, tumour, or abcess.

Hydrocele of the processus vaginalis may appear as a cyst of the round ligament, and be confounded with true peritoneal hydrocele. It may cursorily be mistaken for an inguinal hernia. Other tumours

* See 'Salpingocele,' p. 623.

of the round ligaments occur, either independently of, or associated with, inguinal hernia. These tumours develop in the inguinal canal, and are of a myomatous or myo-sarcomatous nature. Howard Kelly has recorded an interesting case of pseudo-myxoma consequent upon rupture of an ovarian cyst, and also a myoma of the round ligament.

Tumours.—Enormous pendulous tumours have been recorded as growing from the vulva, such as encapsulated fibromyoma (Réverdin), molluscum pendulum, a pedunculated polypus (Moclaire). Of the latter, an example reached as far as the inner condyle of the femur, thirteen inches in length. In its point of greatest diameter it reached twenty-five inches. Large pedunculated myxomatous tumours have been recorded (Kortright).

Epithelioma and Chancroid.

An admirable differential table of epithelioma and chancroid of the vulva has been drawn up by Davis of Atlanta, who lays down the following distinctions :—

EPITHELIOMA.	CHANCROID.
Age.—Usually occurs later in life, after 35 years. There are recorded cases occurring at 18 years of age. These are rare.	Occurs usually early, but may be observed in the old.
Heredity.—Usually history of malignant disease of ancestors.	Plays no part.
Location.—When confined to cervix, most frequently found at the site of a previous laceration.	On lower fourth of vagina, and sometimes on cervix.
Frequency.—Not of rare occurrence. Married women and those having borne children suffer oftenest.	Rare. Prostitutes or married women who become infected by their husbands are affected.
Development.—Usually slow at first. Begins as a hard elevation or nodule.	Rapid. Begins as a pustule, rapidly becoming an ulcer.
Number.—At first a simple ulcer, until the glandular tissue breaks down, forming another.	May be single at first, but rapidly becomes multiple.
Auto-inoculation.—Questionable.	Auto-inoculable, producing characteristic chancroid.
Colour.—Dirty, with livid edges covered over with broken-down tissue. Discharges a fœtid ichorous fluid, very irritating.	Yellow, tawny, and discharging a yellow pus.

Hydrorrhœa.—Hæmorrhage. No tendency to cicatrization. Extends in direction of vagina and body of uterus.	No hydrorrhœa; little hæmorrhage. Evidences of cicatrization on vaginal and cervical surface.
Buboes.—Late. Multiple enlargement of glands.	Occur early and suppurate, as a rule. Usually single.
Microscope.—Shows presence of epithelial scales in so-called nests.	Absence of these.
Cachexia.—Marked—in the later stages of the disease.	Usually absent.

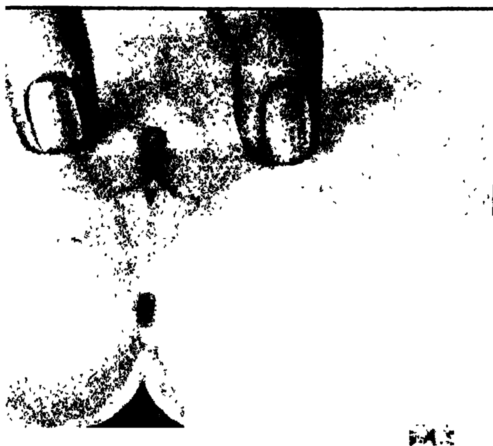


FIG. 519.—CONGENITAL MALFORMATION OF THE VULVA, PARTIAL ATRESIA OF THE VAGINA WITH ABNORMAL UTERUS AND ABSENCE OF THE ADNEXA - IN CHILD OF THREE YEARS OF AGE. (See p. 783.)

CHAPTER XXXIX.

AFFECTIONS OF THE VAGINA.

Vaginismus.
Vaginitis.
,, simple.
,, cystic.
,, granular.
gonorrhœal.
diphtheritic.
Malformation.
Atresia.
Partial—Congenital and acquired.
Complete—Congenital and acquired.
Injuries resulting in cicatricial contractions and adhesions.
Syphilis.
Prolapse.
Tuberculosis.
Cancer.
Tumours—cysts.
,, —fibroma.
Foreign bodies.
Abcess in the urethro-vaginal septum.*
Varicocele of the recto-vaginal septum.†
Fistulæ.
,, vesico-vaginal.
,, urethro-vaginal.
,, urethro-vesico-vaginal.
,, vesico-uterine.
,, recto-vaginal.
,, perinæo-vaginal.
,, urethro-vaginal.
,, peritoneo-vaginal.

Vaginismus.—Vaginismus is one of those terms unfortunately employed to distinguish a disease, when it should only be used as descriptive of a symptom that may be due to several morbid or abnormal conditions, both of the vulvar orifice and vagina. The spasm attending the vaginismus has been looked on by some as a 'neurosis of motion' (Matthews Duncan). There can be no doubt that we find this symptom associated with morbid apprehensiveness of touch or intercourse in women whom we describe generally, if somewhat loosely, as 'neurotic,' or by the equally vague and general term, 'hysterical.' Hyperæsthesia of the vulvar outlet expresses more correctly the condition. The muscles said to

* See chapter on the Urethra. † See chapter on the Rectum.

be principally affected are the bulbo-cavernosi and the levator ani, but the entire muscular structure, voluntary and involuntary, including frequently the abductors of the thigh and the glutei, appear to be involved in the spasm. There is a state of extreme irritability of the nerves supplying the vulvar orifice and the vagina; and this irritability is often associated with a vascularity of the vestibule, and a condition that Tait has described as '*serpiginous vascular degeneration.*'

Causation.

Hysteria.
Vulvar hyperæsthesia (Tillaux).
Slight ulceration of the vulvar orifice.
Serpiginous vascular degeneration of the vestibule (Tait).
Fissures.
Disproportion between the size of the penis and the vaginal orifice.
Caruncle of the urethra.
Chronic vaginitis.
Chronic endometritis.
Coccygodinia.
Masturbation.
Incomplete intercourse.
Uterine inflammatory states and morbid discharges.

It is frequently associated with—

Amenorrhœa.
Dysmenorrhœa.
Uterine cervical catarrh.

Hilton and More Madden have dwelt on the nerve supply of the sphincters (vaginal, rectal, urethral), and the part played by the common nerve supply of these orifices. It is urged that in vaginismus the lesion in the sensitive filaments of the internal pudic nerve, distributed to the vulva, vagina, and anus, is the cause of the reflex spasm and pain. There is an important anatomical defect, to which Hégar and Kaltenbach have drawn attention, that in itself may cause ineffectual intercourse, viz. the position of the vaginal orifice, which is placed too far forwards in consequence of too great pelvic obliquity. In some women the clitoris, also, is abnormally placed; and, lying more in front, there is not the same natural sexual gratification as when it is in the normal position.

Such women complain that intercourse has little or no pleasurable effect. Yet they frequently conceive and bear children.

The cases are frequent in which coitus is prevented through a vaginitis that commences shortly after marriage from incomplete and repeated attempts on the part of the husband. This may be due to rigidity of the hymen, a contracted outlet, or some previous sensitiveness, the result of an old leucorrhœa and a slight cervical erosion that has passed unnoticed. A muco-purulent discharge commences, and the vulva is swollen, or small erosions appear on the lips, and the follicles stand out as little purulent points on the mucous surfaces. Here intercourse is impossible or only completed with great pain. The woman's health suffers in mind and body. The happiness of married life is interrupted.

I have treated many such cases, and quite recently one in which for nearly three years after marriage coitus had to be abandoned. The uterus was tented and superficially curetted; an erosion of the cervix was cured by nitric acid application; the aphthous and eroded spots on the vulva and about the urethra were touched with carbolic acid, and vaginal glass dilators were used both to keep the vagina dilated and as rests. Within two months from the commencement of the treatment the patient was pregnant.

Impotence in the Husband a Cause.—A patient, some years since, consulted me, who gave the following history. She had married six months previously. Her husband never had a complete erection. This led to frequently repeated and futile attempts at intercourse. Of late any attempt at coitus produced the greatest pain. On examination I found a catarrhal discharge pouring from the highly irritable and vascular vulva. The general health had also deteriorated. On further inquiry I detected in the husband a spinal lesion, which explained the impotence. This is but an example of similar cases that I have from time to time seen, in which ineffectual and awkward coitus has gradually produced hyperæsthesia and irritability of the vulvar muscles. The same general condition follows upon intentional suppression of emission in order to prevent conception. (Consult chapter on Sterility.)

Fibroma of the Clitoris.—Some time since a patient came to me for severe vaginismus and difficulty of intercourse. On examination I discovered springing from a hypertrophied clitoris a pear-shaped, fibromatous mass, which the patient stated had been there for years, but had of late grown larger. I removed this with the galvanic écraseur, and with subsequent dilatation she was rapidly cured.

Symptoms and Physical Signs.—The slightest touch, even with a feather, of the mucous membrane of the vulva, causes, in aggravated cases, pain and spasm. Examination with the finger is impossible. Sexual intercourse, at first painful, becomes ultimately intolerable, and all sexual desire is lost.

On examination of the external genitals we may discover in some

exquisitely sensitive spot the source of the pain and dyspareunia. The margins of the hymen in married women may be hypertrophied. We may detect a fissure at the fourchette, some small ulcers about the hymen or near the urethral orifice, or an irritable caruncle of the urethra and general vascularity of the vulvar orifice. In any case of vaginismus where we cannot discover a local cause for the spasm in the vulva or vagina, a careful exploration of the rectum should be made. In many cases there is a rigidity of the sphincter ani—this chronic condition of rectal spasm, Sims says, is pathognomonic. We may find the source of the affection in some ulcer, fissure, or hæmorrhoidal state of the rectum or anus. In connection with this fact, it must be remembered that excessive sexual indulgence may predispose to a hæmorrhoidal condition of the rectum.

Diagnosis. -This is easily made, and the history of the case is of itself sufficient to indicate the affection.

Treatment may be divided into general and local.

The General Treatment consists of :

Avoidance of intercourse.

Change of air.

Sea bathing.

Warm alkaline baths of soda and starch, using a bath speculum in the vagina.

Exercise. (Horse-exercise specially recommended.)

Administration of Tonics :

Bromides, with valerian.

Bromide and valerianate of zinc.

Attention to, and avoidance of a too stimulating, diet.

Local treatment :

Warm vaginal washes of—

Perchloride of mercury (1 in 5000).

Laudanum (ʒi. in Oi.).

Chloral (gr. xx.—xxx. in Oi.).

Liq. plumb. subacetatis (ʒi. in Oii.).

Tincture of calendula (℥ss. in ℥x.).

Suppositories—

Cocaine (gr. ii.).

Morphia (gr. i.).

Belladonna ext. (gr. ii.).

Iodoform (gr. v.).

Hyoscyamus ext. (gr. x.).

Lanolated Creams of—

Cocaine (2–4 per cent.).

Belladonna Extract (gr. x. ad ℥i.).

Morphia (gr. v. ad. ℥i.).

Atropia (gr. ii. ad. ℥i.).

Iodoform disguised with coumarin (gr. xx.—ʒiv.).

Vasol—Iodine—Ichthyol.

A vaginal dilator or rest may be worn at night, and also for some time in the day. It can be retained in its place by a perinæal bandage.

Medicated glycerine tampons, or of chloral and cocaine or ichthyol, may be worn at night.

The warm vaginal douche may be used night and morning, with alkaline, sedative, or astringent lotions added.

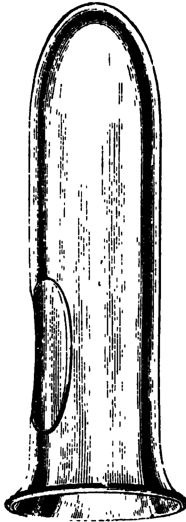


FIG. 550.—SIMS' VAGINAL REST.

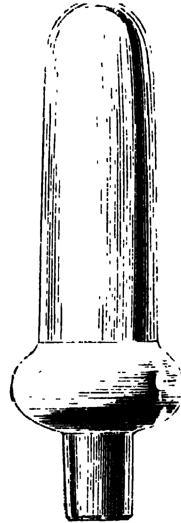


FIG. 551.—SOLID GLASS DILATOR AND REST OF AUTHOR (Mayer and Meltzer), made in three sizes. I find these far more effectual than the light, hollow rest of Sims.

Applications :

Cocaine (5–10 per cent.).

Solution of nitrate of silver (gr. xx.—ʒi. ad ℥i. pencilled to the sensitive parts).

Nitrate of silver (the fused stick lightly touched to the eroded or sensitive parts.

Carbolic acid, used in the same way.

Operative Measures.—To dilate the vagina, a diverging and conical Cusco's bivalve vaginal speculum with obturator may be used. The patient having been anæsthetized, the vulvar orifice is dilated with the thumbs, and the dilator is passed. I prefer the solid glass one. It is left in the vagina for some hours. For a few days subsequently the dilator can be gently introduced, and is retained

in the vagina with a T-bandage for an hour or more. She can then pass it herself a few times daily, and can keep it for a short time in its position with a diaper. Sims' operation consists in ablation of the hymen and incision of the perinæal body. The first step of the operation is performed with a curved scissors; the second with a scalpel, two incisions being made through the vaginal tissue, one at either side of the mesial line of the perinæum, both meeting in the raphé. 'Each cut will be about two inches long, *i.e.* half an inch or more above the edge of the sphincter, half an inch over its fibres, and an inch from its lower edge to the perinæal raphé.' Sims' operative procedure will seldom be found necessary if the other means of treatment are carefully carried out, especially removal of the hypertrophied portions of hymen and systematic dilatation of the vagina. More Madden advocates Emmet's modification of Sims' operation—by means of the finger within the anus. The sphincter ani is pressed against the posterior wall of the vagina, and with a scissors the fibres encircling the vagina on each side are freely divided under the mucous membrane. Obviously, all special applications will fail if we do not recognize and treat any diseased condition of uterus, vagina, or vulva which causes or complicates the vaginismus. The state of the urine * must be carefully inquired

* To show the importance of examining the urine in cases of vaginal irritation, I here give the analysis of a few specimens selected from cases in which the irritation was unequivocally due to the urinary secretion:—

URINE OF PATIENTS SUFFERING FROM SEVERE HYPERÆSTHESIA, PRURITUS VULVÆ, AND SLIGHT VULVITIS.

No. 6 was pale lemon-coloured, turbid, and deposited on standing a mixed sediment.

No. 7 had a similar colour, but was more turbid, and gave a larger deposit on standing a short time.

Their analysis gave the following results:

	No. 6.	No. 7.
Specific gravity	1016	1021
Reaction	Acid.	Acid.
Total solids, per cent.	3·70	4·90
„ urea, per cent.	1·14	1·82
„ uric acid, per cent.	0·05	0·06
„ acidity, per cent.	0·42	0·39
„ sugar, per cent.	0·01	0·005
„ phosphoric anhydride as phosphate	0·39	0·36
„ chlorine as chlorides	0·32	0·63

The deposit from No. 6 was isolated, and there were rosette prisms of ammonio-magnesium phosphate, hexagons of uric acid, mucus, epithelium, and débris.

The deposit from No. 7 was ammonio-magnesium phosphate, calcium phos-

into, any uterine discharge attended to, any vascular urethral growths removed, and small ulcerations and fissure of the vaginal

phate, octahedral calcium oxalate, acicular uric acid, a few globules of fat, mucus, epithelium, and débris. G. B.

	No. 8.
Specific gravity	1026
Reaction	Acidulous.
Total solids, per cent.	6·11
„ urea, per cent.	1·42
„ uric acid, per cent	0·08
„ acidity, per cent.	0·87
„ phosphoric anhydride as phosphate	0·55
„ chlorine as chlorides	0·54
„ sugar.	0·03
„ albumen	A faint trace.

This 'evening' urine was excessively acid and super-phosphatic.

The deposit contained was octahedral, and dumb-bell forms of calcium oxalate, spheroids of sodium urate, rhombs of calcium phosphate, a few pus granules, mucus, epithelium, and urinary débris.

Urine of Patient suffering from Follicular Vulvitis.

Urine of patient suffering from chronic and recurrent follicular vulvitis, with severe irritation and pruritus:

Reaction	Acidulous.
Specific gravity	1021
Urea, per cent.	1·7
Sugar, per cent.	0·25
Albumen	A faint trace.
Acidity	0·032

The deposit contained abundance of vesical mucus and epithelium, a few pus granules, stellate or rosette masses of the acicular crystals of uric acid coloured with uroxanthin and fat globules.

The albuminous reaction of the urine may have originated from the serum of pus.

The sugar was estimated volumetrically by the ammoniacal copper test (Dr. Pavy's).

Urine of Patient suffering from Vaginal Hyperæsthesia and Irritation.

Specific gravity	1027
Reaction	Acidulous.
Total solids, per cent.	6·35
„ urea, per cent.	2·40
„ uric acid, per cent.	0·10
„ acidity, per cent.	1·17
„ sugar, per cent.	0·03
„ phosphoric anhydride as phosphates	0·89
„ chlorine as chlorides	0·42

The deposit consisted of sodium and ammonium urates, uric acid, ammonio-magnesium phosphate, mucus, epithelium, and débris.

A highly acid and super-phosphatic urine loaded with urates, and slowly changing into phosphates and free uric acid.

orifice are healed. These cases are frequently cured by parturition. At times the essentially neurotic nature of the complaint is shown by the return of the symptoms after labour.

Gaillard Thomas and Sims proposed in those cases where the marital act is impossible from the attendant pain, to thoroughly anæsthetize the woman, in the hope that complete connection, under these circumstances, may result in pregnancy. Mann, objecting to this suggestion, says that even if pregnancy occur in such cases it does not cure the vaginismus, which returns after it has terminated.

VAGINITIS.

The clinical division of vaginitis into *constitutional* and *local* is most important from a practical point of view. It is natural that, in his anxiety to cure this troublesome and often obstinate local disorder, the practitioner should occasionally overlook the constitutional state behind it. There are few who cannot recall to mind cases of vaginitis that have resisted active local treatment, and in which errors of diet or a disordered condition of the urinary organs have explained the obstinacy of the inflammation. The rectification of the constitutional error has been the first step towards the amelioration of the local irritation.

Varieties.—Vaginitis is:

Acute and Chronic.

Simple.
Cystic.
Granular.
Gonorrhœal.
Diphtheritic.

Simple Acute Vaginitis.

Causation.—In practice the first important point to decide is whether the vaginitis be a primary affection, or if it be secondary to either (*a*) any constitutional error, or (*b*) some local disorder in the uterus or bladder.

As a primary affection it owes its origin most frequently to:

Exposure to cold.
Traumatic causes.
Violent coitus.
Pessaries.
Caustics and irritants.

Pathology.—The vaginal mucous membrane passes through the ordinary stages of inflammation: increased vascularity, congestion, and swelling. At first there is arrested, and secondarily increased, secretion. This inflammatory state is attended by desquamation of the epithelium, and a secretion of mucus with pus. Frequently this stripping of the epithelium leads, from the irritation of accumulated acrid discharge, to ulceration. In patients whose general health is impaired, and who contract vaginitis through the irritation of purulent discharges from the uterus, membranes may form on the vaginal mucous surface of a diphtheritic character. These same vaginal croupous membranes are found in connection with the exanthemata. Adhesions and contractions may result, which almost completely occlude the canal—*adhesive vaginitis.*

Symptoms.—Acute vaginitis reaches a climax in from eight to ten days. It commences with a sense of heat and burning in the vagina, and a frequent desire to pass water. There is a muco-purulent discharge, which occasionally is fœtid. Pelvic and vaginal pain or perinæal throbbing follows. Scalding and smarting sensation during micturition, with excoriation of the vulva, are frequent attendants. The acid mucus secreted in chronic vaginitis is destructive to spermatozoa, and may prevent conception.

Cystic Vaginitis.

Occasionally small follicular cysts are found in the neighbourhood of the cervix uteri in either fornix. They are treated in the same manner as directed for the cervical follicles, incised and curetted. The small cavity is touched with a fine probe point dipped in carbolic acid. (See Cysts of the Vagina.)

Granular Vaginitis.

Causation.—In this variety a 'granular' condition of the mucous membrane follows the acute inflammation. The papillæ are enlarged; the mucous follicles also are hypertrophied. It is more often associated with pregnancy. We frequently see a granular state of the vaginal mucous membrane where the inflammatory condition has arisen from gonorrhœal discharges, or where endometritis and cystitis have complicated the vaginitis. I have had cases in virgins in whom there was no reason to suspect unchastity as the cause.

Physical Signs and Symptoms.—If with the tubular speculum the vagina be cleaned out, and the walls wiped with cotton-wool, so as to remove all discharge as it is withdrawn, the rugæ will be seen enlarged and the recto-vaginal and vesical septa swollen. The rough, eroded, granular, dark-red, and, here and there, fissured appearance of the mucous membrane, is quite characteristic of this form of vaginitis. On wiping the surface of the membrane with a sponge or cotton-wool, in the earlier stages of the disease, we find that it bleeds readily. The os and external surface of the cervix uteri are frequently engorged and granular. There is considerable irritation; the patient awakes at night, disturbed by the itching, smarting, and heat. Pruritus of the vulva is often present to aggravate the other symptoms, and this is rendered more difficult to treat in consequence of the acrid discharge which comes from the vagina. The possible complication of commencing carcinoma of the cervix must be remembered.

Gonorrhœal Vaginitis (Specific).

Few morbid conditions of the genital organs in a woman are attended with such serious and permanent consequences as gonorrhœa. Despite every care in treatment, the latent virus may from time to time give rise to a variety of pelvic disorders; and when we least suspect it, the gonorrhœal taint is the source of some obstinate affection of the ovary, Fallopian tube, uterus, or pelvic peritoneum. It is not so much on account of the immediate symptoms or distress that we have to regard gonorrhœa in the female as a serious affection, as from the remote results which for years after the disease is contracted may continue at irregular intervals to cause uterine and other pelvic trouble.*

Pyo-salpinx following Acute Gonorrhœa.

Edebohls † records the history of a patient who had specific urethritis set in four days after intercourse. Vaginitis, endometritis, and double salpingitis rapidly followed, the latter being diagnosed on the tenth day after infection. At the end of four weeks acute pelvic peritonitis occurred, and the enlarged tube was punctured and pus escaped. Five weeks after infection the appendages were removed. Section displayed a pelvic peritonitis, with abundant exudation, from which the left tube, containing about two drachms of pus, was readily detached, on account of its recent adhesions. The abdominal

* See Gonorrhœal Proctitis.

† *New York Journal of Gynæcology and Obstetrics*, December, 1891.

end of the tube was found to be widely distended, but glued to the wall of the pelvis. The appendages of the right side were also removed. There was no occasion for drainage, the abdomen was closed, and the patient promptly recovered.

Cullingworth * has forcibly insisted on the effects of gonorrhœal salpingitis in sealing up by adhesive inflammation the pavilion of the tube. Should this be bilateral, the consequence is sterility, and he argues that this is one explanation why prostitutes are so often sterile. He is on the side of those who regard pyo-salpinx as a frequent sequence of gonorrhœa, and considers that the views of Noeggerath as to the latency and incurability of gonorrhœa, and the possibility of such latent infection being roused into activity, have not received the attention they deserve. As we have already pointed out in dealing with salpingitis, Cullingworth notices the freedom of the vagina from gonorrhœal vaginitis in a large proportion of cases, while the ducts of the vulvo-vaginal glands, and the mucous surfaces of the vulva, are frequently attacked. It is the mucous membrane of the cervix uteri that is the more special site of the inflammation. This fact accounts for the more serious and permanent adnexal complications of gonorrhœal inflammation. We have already seen how syphilis may be associated with gonorrhœa, and that possibly the syphilitic poison may be masked by the gonorrhœa.

With all of these observations I entirely concur. I quote them here so as to support the view I have taken in past editions of the work on the ætiological importance of gonorrhœa as a potent source of pelvic disorders in the female.

Gonorrhœal Infection in Childbed.—Léopold † insists on the possibility of the fever of childbed being originated by the gonorrhœal virus, which latter has been present previous to the confinement in the vaginal discharges. Thus the condition may arise quite independent of any vaginal examination.

Diagnosis—This must depend on the history of the case, the examination of the husband, the intensity of the symptoms, and the transmission to the male from intercourse. It is necessary to lay special stress on the extreme care with which, should we suspect gonorrhœa in a married woman, we must investigate the case. The gonococcus of Neisser (*Merismopedia gonorrhœa*) should be sought for in the discharge.‡

Two facts have to be remembered in practice, which have a most important bearing on the subject :—

1. Other discharges in the woman than that of gonorrhœa may originate blenorrhœal discharge in the male. This is more

* *British Medical Journal*, July 20, 1889.

† *Centralblatt für Gynäkologie*, 1893.

‡ It will be remembered that the vaginal epithelium is hostile to the invasion of the gonococcus.—AUTHOR.

likely to occur in men of a gouty temperament, and who may have had some latent urethritis existing, of a specific or non-specific nature.

'I have seen,' says Sims, 'many cases of urethral inflammation in the husband that were unquestionably contracted from the wife, who, however, had merely a leucorrhœa of an acrid character.' So has the author frequently.

Guérin explains the fact, well known in practice, that women who are apparently healthy, and who may fancy themselves to be so, often convey infection by the localization of the disease in the upper part of the vagina and the vaginal cul-de-sac.

2. As we may have little to guide us save the intensity of the symptoms and the urethral complication, without other collateral and confirmatory proof, sufficient to warrant a practitioner in coming to a conclusion, we must be extremely cautious in expressing an opinion that the disease is specific.

The attendant should judiciously frame an excuse for seeing either the husband or wife. This can be done without letting either see that we suspect the disease is anything more than an ordinary attack of inflammation. Much will depend on the tact and discretion of the practitioner.

Symptoms and Physical Signs.—Every symptom of simple vaginitis is exaggerated. The onset of the attack is more severe. The discharge is more profuse and purulent. The local signs of inflammation are intensified, and there is greater scalding on passing urine. There is more swelling of the vulva. It may be excoriated, and the discharge tinged with blood.

The conditions to which gonorrhœa may give rise are—

Vulvitis and vulvar abscess.
Cystitis and ureteritis.
Metritis.
Endometritis (cervical and corporeal).
Salpingitis.
Ovaritis.
Peri-uterine phlegmon.
Perimetritis.
Sterility.
Bubo.

Treatment of Simple Vaginitis.—Acute Stages.—Rest in bed; warm baths; vaginal injections containing borate of soda, Condy's

fluid (ʒi.—Oi.), laudanum, decoction of poppy-heads, belladonna (such warm injections are to be used gently and slowly). The bath speculum (Fig. 53) may be used in a warm sitz-bath, to which some carbonate of soda and starch have been added, and this can be repeated three times in the day. The warm vaginal douche, to which a little laudanum is added, will be found to afford great relief. These douches can be used three times daily. The nurse or the patient herself can be taught how to secure some wool either on a uterine probe or speculum forceps, and, having smeared it well with some sedative ointment of morphia or belladonna, to apply it to the vaginal mucous membrane after the bath injection or douche. At night a medicated glycerine tampon of belladonna or hyoscyamus and cocaine may be used. This can be applied the last thing before going to sleep, and removed in the early morning. Later on in the affection, tannin (ʒii. ad ℥i.) may be added to the glycerine, and the tampon need not be disturbed for twenty-four hours. Sleep may be secured by bromide of potassium and chloral, a preparation of opium, or other hypnotic. The bowel must be kept free with a saline purgative. The diet should be non-stimulating, and alcohol altogether abstained from. If there be urethritis and vesical irritation, the oils of cubebs, copaiba, or santal, prescribed in emulsion, are of service. They can be given in palatinoids or capsules.

℞. Pulv. gum acaciæ, ʒi.
Ol. santal,
Ol. cubebarum, } āā ʒi.
Ol. copaibæ,
Liquor potassæ, ʒi.
Tinct. hyoscyami, ʒii.
Elixir saccharin, ʒi.
Mist. amygdal., ad ʒviii.
Ft. emulsio. Take a tablespoonful three times in the day.

The infusions of juniper, uva ursi, and buchu may be taken. Diluent drinks and infusion of linseed should be given.

Second Stage.—The acute stage over, mild astringent lotions of sulpho-carbolate of zinc, sulphate of zinc, subacetate of lead, alum, boric, salicylic or tannic acid, and matico can be used. Perhaps the best wash will be found to be that of perchloride of mercury (1 in 5000). This is used three times in the day. The warm douche should be continued, and the same sedatives used to allay irritation. Vaginal suppositories of cocaine, belladonna, tannic acid, acetate of

lead, or iodoform, may be used at night. Any uterine complication should be attended to. If there be a fistulous opening into the vagina this should be closed. Should the disease prove obstinate, the vagina may be mopped out through a cylindrical speculum with a nitrate of silver solution or carbolic acid and glycerine.

Treatment of Granular Vaginitis.—Edis spoke highly of carbolic acid (ʒii.–ʒiv. ad ℥i. glycerine) in cases of *granular vaginitis.* I have found excellent results from the use of chloride of zinc (grs. xxx. ad ℥i. glycerine). The vagina is first wiped dry, and all discharge is removed. Having so done, I prefer to pack the vagina with a tampon of dry absorbent cotton-wool. This is left in the passage for a few minutes, and then withdrawn. The vaginal walls are thus completely dried. A Fergusson's speculum is now introduced, and during its withdrawal the entire vaginal surface is swabbed with any solution we wish to use. Thus the greatest relief from the sense of pain, heat, and itching will be obtained by swabbing the vaginal walls once with weak solutions either of nitrate of silver or perchloride of mercury, ten grains to the ounce of the former and $\frac{1}{16}$ of a grain to the ounce of the latter. It is not necessary, save in rare and obstinate cases, to use very powerful solutions, or the strong nitrate of silver recommended. On the whole, save in very exceptional cases, *I think practitioners will do well to abstain from strong and heroic remedies in vaginitis.* The solid glass vaginal rest will be found a useful aid in dealing with this affection.

Treatment of Gonorrhœal Vaginitis.—There are some precautions which it is right to insist that the practitioner should specially observe in this form of vaginitis :—

1. In the acute stage avoid any forcible injections; use simple soothing baths (Lawson Tait).

2. Before employing an astringent lotion, let the acute stage completely subside.

3. Attend to the rectum.

4. Keep the patient under observation for some time after the disease is apparently cured.

5. Remember the chronic and relapsing nature of the affection, the liability of the patient to attacks of endometritis and ovaritis for a considerable time, as well as the latent character of the gonorrhœal virus.

Great care has to be observed with regard to the rectum should there be any doubt as to the gonorrhœal nature of the attack.

The bowel may be infected by contact with the discharges, or in placing any suppositories, and in the giving of injections. Should this unfortunately occur, rectal alkaline washes, to which some boric acid and hazeline are added, must be used.

Atresia of Uterus and Vagina.

Partial or complete closure of the uterine or vaginal canals or of the vulvar orifice may exist, either as a congenital malformation or an acquired condition. Partial closure of the uterine canal we are familiar with as 'stenosis.' Complete atresia of the uterus may be the result of closure of either the external os or internal isthmus. If there be closure of the lips of the uterine orifice, the entire uterus is generally distended, the walls being either hypertrophied, or, on the other hand, considerably thinned (Scanzoni). If the internal isthmus be closed, the cavity of the body is dilated.

Congenital Malformations.*

Causes.—With regard to malformations of the genital organs, the student is familiar with the development of the canal of Müller and the Wolffian body, the kidney and ureter on the one hand, and the ovary on the other. He will remember that from the canals of Müller arise the Fallopian tubes, the uterus and vagina, which are at this embryonic stage double. A malformation of the uterus or vagina may be due to a defect of development in any degree of the canals of Müller, whether that defect be due to simple arrest, a fault of fusion, or the suppression of either. We might thus classify the results of these embryonic accidents of development in the adult as follows:

Malformations of the Uterus.

(*a*) Complete absence of uterus; (*b*) rudimentary uterus; (*c*) bipartite uterus, in which latter the neck may exist and the defect be in the body, or there may be an arrested development of the latter; (*d*) infantile uterus; (*e*) undeveloped body, with preternaturally long and tapering neck; (*f*) fœtal uterus, in which there is an advance and development on the last named.

Malformations of the Vagina.

Absence of, complete or partial; according to Pozzi, this rudimentary vagina is due to persistence of the vestibular canal, and

* See drawing, p. 764, and case, p. 783.

arrest of development of portion of the vagina. Schroeder believes that when the middle of the vaginal canal persists, but is closed above and below, it is consequent upon an obliteration of one of the Müllerian conduits at the upper and lower end of the canal. Thus, whether the malformation assume the form of closure of the vagina, or a partitioning of this canal by a partial or complete septum, a double uterine orifice and neck, or any other variety of uterine abnormality, depends upon correlative deviations from the

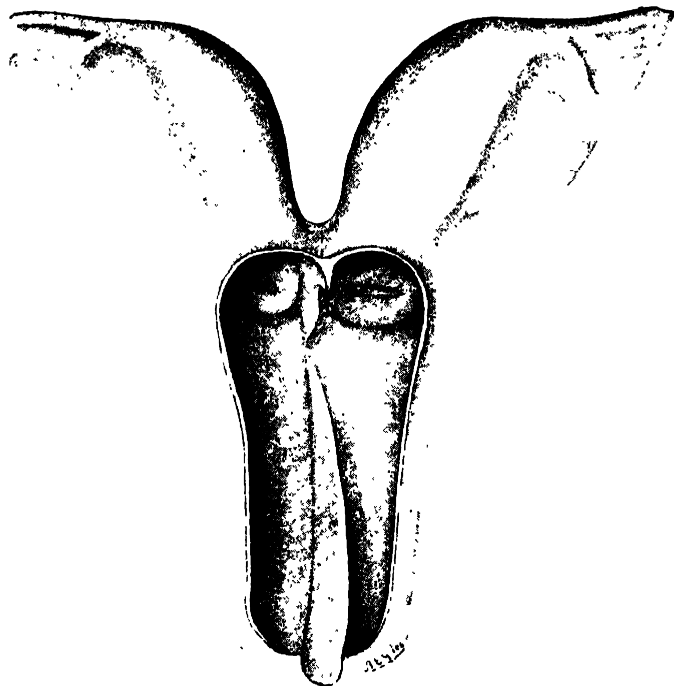


FIG. 552.—UTERUS DIDELPHYS. The vaginal portion drawn from nature; the supra-vaginal portion semi-diagrammatic. (A. E. Giles.)

normal development of the Müllerian canals. The didelphian (Δις; δελφυς) malformation is that in which no fusion occurs, and in which each separate neck opens into its own vagina (Figs. 552, 553).

Malformations of the Hymen.

In referring to the hymen, Chap. I., I have already fully alluded to various abnormalities in its shape and structure.*

Pozzi draws attention to the error that may be made in mistaking

* See pp. 8–10.

an over-development of the hymen as nymphæ, and thus concluding that the hymen is absent, but the most common form is the *labiate* (Brouardel). A slit separates two valves, passing backwards from the vaginal bulb in front. In the newly born, a bougie, with a diameter of 0·0009 m., can be passed. This form may persist during life. In a child of seven years a bougie 0·01 m. in diameter can be introduced, and in a marriageable girl the finger penetrates easily. Brouardel makes these observations (most important from the point of view of legal medicine) on the hymen of young girls. During examination with the thighs separated, the membrane is so tense that the finger cannot penetrate, but if they are approximated the hymen folds itself like a pouch and the posterior valve is depressed, the hymeneal orifice thus becoming larger and more distensile. Penetration offers no difficulty, and it is well to note that this applies as much to the penis of an accused person as to the finger of an expert.*

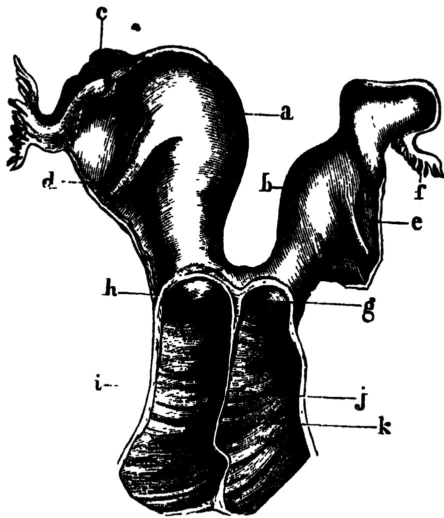


FIG. 553.—DIDELPHIAN UTERUS-VAGINA DIVIDED BY A PARTIAL SEPTUM. *a*, Right segment; *b*, left segment; *c*, *d*, ovary and right round ligament; *e*, ovary and left round ligament; *f*, Fallopian tube; *g*, left cervix; *h*, right cervix; *k*, septum of double vagina (*i j*). (Olivier.)

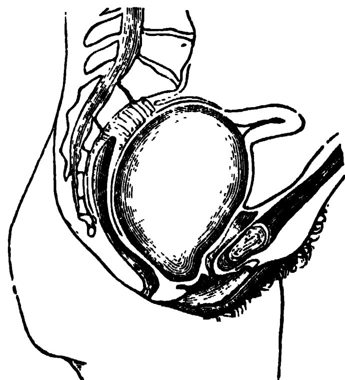


FIG. 554.—HÆMATO-COLPOS, FROM ATRESIA OF THE VAGINA.

Varieties of Malformation.

Pozzi describes the following forms: (a) *annular*; (b) *circular* (*orificentral*);

* For various anomalies in the position and form of the hymen, as also in its structure and thickness, the reader may well consult Pozzi's *Traité de Gynæcologie*, on the development and abnormalities of the hymen.

(c) *semi-lunar* (*orifice nearer upper border*); (d) *falciform*; (e) *fleshy* (*of various shapes*); (f) *fringed*; (g) *fundibuliform*; (h) *hypertrophic*; (i) *divided* (*and no openings separated by a partition*); (j) *cribriform*; (k) *columnated* (*continuation of the pillar of the vagina on the posterior surface of the hymen*). Pozzi states that in cases of atresia of the hymen, when it is said to be imperforate, it is simply joined to an adhesion of the vaginal walls (hæmatocolpos) which has imprisoned menstrual fluid, and from which it is detached when this is evacuated (Matthews Duncan, Schroeder, Godfrey).

Among the anomalies of structure noted are (1) excessive thickness; (2) great rigidity; (3) vascularity. Pozzi considers that congenital absence of the hymen is a condition the occurrence of which is to be regarded with grave doubt.

CAUSATION.

1. *Congenital.*—Various forms of *malformation of the genital canal* may exist, such as double uterus with imperforate hymen at one side, or absence of the vagina. Or the double uterus has one horn closed and there is a single vagina; other malformations and complications may occur, such as a hernia of the ovary (p. 3). If the vagina be congenitally absent, the uterus is often absent also.

2. *Acquired.*—The more common causes producing acquired atresia of the uterus are—

Parturition.
The use of caustics.
Operations on the cervix.
Cervical endometritis.
Senile atrophy.

Physical Signs of Atresia of the Uterus—

Absence of menstruation.
Presence of a tumour in the hypogastrium.
A uterine tumour felt through vagina, which gives a sensation of elasticity.
Impossibility of passing the uterine sound.

Symptoms.—The symptoms will be those which we have already considered as resulting from absence of menstruation. Also the patient suffers from the consequences of the occlusion of the genital canal and the local accumulation of blood. These consequences, immediate and remote (in cervical atresia), are:

Accumulation of blood in the uterus—hæmatometra.

„ „ „ Fallopian tube—pseudo hæmato-salpinx (*vide* Hæmato-salpinx).

Accumulation of serum in the uterus—hydrometra.

Perimetritis.

Pelvic hæmorrhage.

Vicarious hæmorrhage.

Rupture of the uterus or Fallopian tube — sepsis and septicæmia.

Atresia of the Vagina.—This condition is either *congenital* or *acquired.*

Congenital Atresia.—In *congenital* atresia, which is very rare, there is arrest of development leading to complete or partial absence of the vagina. The hymen may be imperforate. In many cases, though a superficial examination gives the idea of complete closure of the vaginal orifice, if care be taken a small aperture will be detected under the urethra, and through this the menstrual flow has escaped. In such a case of incomplete atresia, menstruation is frequently erratic in quantity and time of recurrence. A thorough examination of the condition can only be made by means of a finger in the rectum, and the sound passed into the bladder. The urethra may take the place of the vaginal canal, the os uteri opening into it.

A child of three years of age was brought to me for atresia of the vagina. The state of the parts is shown on p. 764. The entrance to the vagina was completely closed, and there was an absence of the labia. A small orifice led to a normal urethra. The outlet was closed completely by integument. On incising this, to a depth of about a quarter of an inch, I came on a rudimentary vaginal canal, which was large enough to admit the little finger, and at its upper end was a small nodule which represented the cervix uteri. Examining through the rectum for the uterus, bimanually, and with a dilator in the bladder, I could feel an imperfectly developed one about three-quarters of an inch in length, and a centimetre in width, but there was no vestige of adnexa at either side. This was verified by a most careful examination. I enlarged the vaginal opening by a backward incision, and freed the lower portion of the mucous membrane of the small vaginal canal, bringing it down and fixing it at the outlet.*

* See Appendix.

Acquired Atresia.—The causes of acquired vaginal atresia are—

Vaginitis.
Parturition.
Injuries, burns, etc.
Syphilitic ulceration.
Caustics.

Physical Signs—

Absence of menstruation after puberty.
Absence of the vaginal canal.
Cicatricial adhesions in the vagina.
Imperforate or persistent hymen.
Bulging of the hymen.
Fluctuating tumour detected per rectum.
Presence of uterus ascertained by the recto-vesical examination.
Enlargement of the abdomen.
In the case of double vagina, there may be atresia of one vaginal canal, the other being permeable; a longitudinal vaginal tumour, which is 'tense and fluctuating,' is felt through the permeable vagina, and cylindrical in shape (atresia of the vagina, Schroeder).

Cullingworth has recorded an interesting case of retained menses, in which the vagina was occluded throughout its lower portion by a membranous structure which was not hymen. The vaginal wall was hypertrophied. He is of opinion that the obstruction in these cases is not at the hymen, but behind it; the hymen frequently lying on the obstructing membrane, and so closely adherent to it as only to be with difficulty recognized as a separate structure.

I recently operated on a case somewhat similar to this one of Cullingworth's. The girl was sixteen years of age; the hymen was normal, but the hymeneal orifice was very small. I was sent for at night, as the girl was developing symptoms of septicæmia, with local signs of uterine and abdominal tenderness. The medical attendant rightly attributing the symptoms to retention of menses, found the vaginal canal inside the hymen occluded, and made ineffectual attempts to reach the retained menstrual secretion. I made a cautious incision through a rather dense partition, and then forced a passage with my finger, thus liberating a quantity of black, tarry fluid. The cavity was well washed out with perchloride of mercury, and tamponned with iodoform gauze. The patient recovered perfectly after a short illness.

Symptoms (after puberty)—

Periodical pain and tenderness in the hypogastric region.
Uterine colic.
Vesical irritation.

Retention of urine.
Abdominal tenderness.
Constitutional symptoms of amenorrhœa.
Vicarious hæmorrhage.

Symptoms of Inflammation and Internal Hæmorrhage from Retained Menses—

Cold Skin.
Rapid pulse.
Rigors.
Vomiting.
Violent abdominal and uterine pain.
Elevation of temperature.

The principal dangers to apprehend are—

Perimetritis.
Peritonitis.
Pelvic hæmorrhage.
Septicæmia.

The retained blood is dark coloured, is of the consistence of treacle, and has no coagula.

Treatment. By aspiration or crucial incision.—Much depends on the seat of the occlusion. Operative interference may be demanded: 1. To set free the imprisoned menstrual fluid; 2. To permit of sexual intercourse. In all operations for uterine or vaginal atresia the two principal dangers which have to be feared are—

(*a*) The admission of air, and septic changes in the fluid.

(*b*) The occurrence of uterine contractions, which may cause a retro-flow of the fluid through the Fallopian tubes.

To avoid the first danger, every antiseptic precaution, both before, during, and after the operation, should be taken to prevent the occurrence of the septicæmia. The branched dilator and cannula of Landau (p. 162) may be used with safety.

Aspiration.—To prevent the second complication, it is better to aspirate gradually, Bartlett's aspirator being used. If the uterus be distended with fluid, and the atresia situated in the cervical canal, not more than one-third of the fluid should be drawn off on the first occasion. A week may be allowed to elapse before a repetition of aspiration; and this careful emptying of the uterus is continued until the entire fluid is removed. The vagina must be well tamponned after each operation.

Opening the Uterine Canal.—The operation for opening the canal of the uterus has to be performed with the greatest care. The vagina is thoroughly washed out with a hot solution of mercuric perchloride, and it is well to keep it tamponned for the twenty-four hours previous with iodoform wool. Gaillard Thomas' method is the safest. 'The cervix is steadied with a tenaculum, and a long exploring needle is passed into the uterine cavity. The sense of resistance once over, the escape of a drop of blood will assure the operator of his success in reaching it. Then putting into the gutter of the needle a delicate tenotome, he pushes it upwards to the required distance to open the canal. This section is repeated on the other three sides; the cavity of the uterus is syringed out with carbolized water, very gently forced from a small syringe; a glass plug is inserted in the cervix, and the vagina tamponned as after aspiration.'

Crucial Incision.—If crucial incision be determined upon, the plan I adopt is as follows (the parts are first thoroughly sterilized): Through a small opening a self-retaining drainage-tube is passed into the vagina, and the fluid is allowed to drain for some time—generally for an hour or more—into a large sponge wrung out of some weak (½ per cent.) formalin solution, which is pressed against the vulva and retained there. When this is removed, a crucial incision is made in the hymen, and any fluid remaining is evacuated. The vagina is then douched out with a perchloride solution (1 in 3000), and, when it is well cleansed, is packed with iodoform gauze. The following day the gauze is removed, and the vagina is again douched. This is repeated for some days, until all risks from any septic infection have passed.

Case of Hæmatometra and Hæmato-salpinx and Hæmato-colpos.

Christopher Martin, in a case of hæmatometra and hæmato-salpinx due to atresia of the vagina, found that the bladder and rectum were in contact, the vagina ending blindly one inch above the hymen, its anterior and posterior walls being fused together to the extent of three inches. He opened the abdomen, and found the uterus distended with menstrual blood, and as large as at the sixth month of pregnancy. At either side the Fallopian tubes were distended with blood, the left one, at the pavilion end, being dilated into a globular mass four inches in diameter and connected to the uterus by a very long pedicle. The upper fourth of the vagina was also distended with retained menstrual blood. The uterus was incised in the middle line, and its sanguineous contents evacuated. It was then irrigated and sponged out. Myo-hysterectomy was next performed. The cervical stump was fixed by silkworm-gut sutures into the lower angle of the incision, the internal os being

flush with the skin, and the peritoneal cavity being carefully isolated. A glass drainage-tube was passed through the gaping cervix down to the bottom of the sac, and the abdominal toilette completed. The patient made an excellent recovery. The cervical canal for some time exuded a little glairy mucus at the lower end of the abdominal wound.

PROLAPSE OF THE VAGINA.

In discussing prolapse of the uterus and elongation of the cervix, it was necessary to refer to vaginal prolapse (see p. 282). It may exist apart from any descent of the uterus. When the vaginal protrusion occurs as a primary affection, it is more likely to lead through traction to supra-vaginal elongation of the cervix than to prolapsus uteri. On the other hand, the three conditions, prolapse of the uterus, elongation of the cervix, and vaginal inversion, are frequently associated.

[*The reader will refer to the chapter on Prolapse of the Uterus, and he will there find discussed all the various correlative conditions and symptoms that are associated with vaginal prolapse, and the different methods of treatment by operation or otherwise.*]

*Operations for Closure of the Vagina.**—In the operation of Amussat the steps are: (1) A catheter is introduced into the bladder, and held by an assistant, and the finger of the left hand is carried into the rectum; (2) a transverse incision is made through the integument, between the rectum and urethra; (3) the handle of the knife and the finger are used to tear open a passage to the tumour; (4) the tumour is opened with a trocar and cannula, a director is introduced through the cannula, and the latter is withdrawn; (5) a knife is used on the director to enlarge the opening. In Dupuytren's operation, an incision is made in the first instance transversely. With the finger and knife-handle, the tissues are then torn through until the tumour is reached. A trocar is plunged into it, and the fluid is evacuated. By means of a perforated sound the opening is enlarged, and the cavity is then washed out with a catheter, and some warm antiseptic water.

CYSTIC TUMOURS IN THE VAGINA.—Cystic tumours are occasionally met with in the vagina. We must be careful not to confound such cysts with

Hernia.
Cold abscess.
Varix.
Cystocele.

* See p. 298.

The cysts are generally single. They are painless, and give rise to little inconvenience, unless they are inflamed. Pressure does not affect the cyst as it would a hernial protrusion. If in doubt as to its nature, a fine exploring needle may be used. The cyst generally contains a clear, glairy fluid. The treatment consists in evacuation of the contents, and removal of the entire or portion of the cyst-wall. The cavity can be treated with carbolic acid. If *sarcomatous tumours* are met with in the vagina, they must, like polypi elsewhere, be removed by the écraseur. Should *epithelioma* attack the vagina, it must be dealt with on the general principles recommended for the treatment of cancer of the uterus.

TUBERCULOSIS.—Tubercular disease of the vagina as a primary affection is exceedingly rare. The form is that of the miliary type, and the resulting ulceration assumes the usual character of ulcers surrounded by a zone of hyperæmic infiltration, in the centre of which is the characteristic grayish ulcer with cleanly-cut edge, the ulcer itself filled with caseous matter, under which lie the indolent granulations of which its base is composed. Where the vulva has been the primary seat of the disease, the lower part of the vagina is the portion affected; but if the infection spread from the uterus, or through its discharges, the posterior wall of the uterus and cul-de-sac is more frequently the seat of the disease.

Treatment.—For such ulceration, early excision of the ulcer, followed by the use of the cautery, or the free application of the curette, is the only rational treatment.

VAGINAL FISTULA.

It is not my intention to discuss minutely in this work the surgical treatment of all the urinary fistulæ.

I shall simply refer to the varieties of fistula and their causes, and conclude with a brief description of the operations for the frequently occurring forms.

Varieties:

Vesico-vaginal fistula.
Urethro-vaginal fistula.
Urethro-vesico-vaginal fistula.
Vesico-utero-vaginal fistula.
Recto-vaginal fistula.
Perineo-vaginal fistula.

Other varieties are described as uretero-vaginal, uretero-uterine, peritoneo-vaginal (Thomas). The names of these fistulæ indicate the organs involved.



FIG. 555.—DIAGRAMMATIC REPRESENTATION OF DIFFERENT VARIETIES OF FISTULA. (After Sinéty.)*

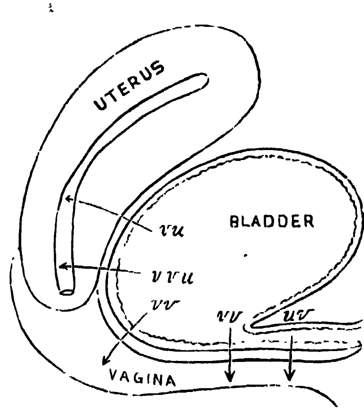


FIG. 556.—GENITAL FISTULÆ. *vu*, utero-vesical; *vvu*, utero-vesico-vaginal; *vv*, *vv*, vesico-vaginal; *uv*, urethro-vaginal.

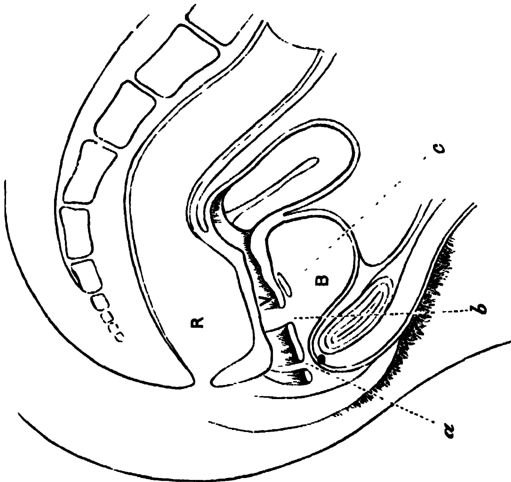


FIG. 557.—*a*, Urethro-vaginal fistula; *b*, urethro-vesico-vaginal fistula; *c*, vesico-vaginal fistula. R, rectum; V, vagina; B, bladder. (Bozeman.)

* See chapter on Affections of the Female Bladder.

Causation :

Parturition ; most frequently protracted labour or the *improper* use of the forceps (*an instrument more often 'sinned against than sinning'*) in cases in which it is contra-indicated by a conjugate, reduced below its working range, or when misdirected and unjustifiable force is employed—very rarely from the well-timed, not too long delayed, and skilled use of the instrument.

Vaginitis.

Traumatic causes.

Phagedæna.

Syphilis.

Cancer.

Stone in the bladder.

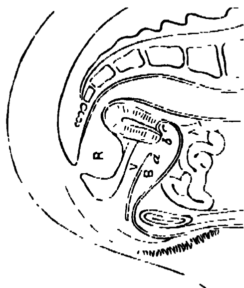


FIG. 558.—INCARCERATION OF CERVIX UTERI IN BLADDER. Posterior lip shown in the Fistula (diagrammatic section, $\frac{1}{8}$th size): knee-elbow position. (Bozeman.)

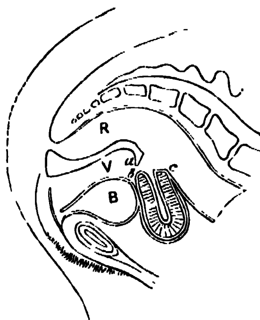


FIG. 559.—INCARCERATION OF CERVIX UTERI IN RECTUM (diagrammatic section, $\frac{1}{8}$th size): knee-elbow position. (Bozeman.)

Symptoms and Physical Signs.—The urgency of the symptoms to a great extent depend on the size and position of the fistula, but the principal ones are the involuntary passage of water or fæces by the vagina, and the excoriation of the skin and soft parts in consequence of this discharge. The fistulous opening is generally easily discovered with a Sims' speculum. Some of the most difficult to detect are the very small or slit-like, and are situated at the summit of the vaginal canal in the fornix.

A minute opening may be concealed by a vaginal fold ; and it frequently requires very careful searching and cleansing with probe, hook, and cotton-wool to detect a small fistulous orifice. Sometimes

it may be necessary to inject the bladder with some coloured solution, as that of aniline or cochineal. If in doubt, place the woman in the knee-elbow position, and let the vaginal canal be well exposed with Sims' speculum. Should any cicatricial bands contract the vagina, or if there be any atresic state of the genital tract, the diagnosis may be still more difficult.

Fistulæ differ in the extent of tissue destroyed, and the consequent size of the opening, which is sometimes so large that the entire base of the bladder is exposed. In a case I had under my care, some years since, this occurred, and there was also a recto-vaginal opening of sufficient size to admit the fingers. Fistulæ thus vary considerably in the amount of cicatricial tissue surrounding the edges. These latter are constantly covered with mucus and phosphatic deposits, which require to be carefully wiped away to see the exact shape, direction, and size of the fistula.

The dependence of vulvitis and vaginitis on the presence of urinary fistula is not to be forgotten. Twice recently, in my practice, the obstinacy of vaginitis was explained by the detection of a small fistulous opening, situated at the junction of the vagina and cervix.

Cullingworth has specially drawn attention to the occurrence of fistula in connection with chronic suppuration of the adnexa, and he points out these typical forms: (1) Rectal fistula, due to the rupture of a suppurating dermoid into the rectum, six weeks after confinement. (2) Vaginal fistula, arising from purulent disease of the appendages of the right side. (3) Cervical fistula, due to ulceration of a suppurating dermoid into the cavity of the uterus in that situation. (4) Vesical fistula, arising from the rupture into the bladder of an abscess arising in connection with the appendages of the right side.

Operation for a Vaginal Fistula.

Preparatory Treatment.—1. Sufficient time after parturition should in all cases be allowed to elapse—six weeks to two months, or even more, if the woman's health be not restored.

2. Change of air; a stay by the seaside; administration of tonics; warm vaginal antiseptic douches of boric acid, chinosol or lysol, attention to the cleanliness of the vagina, the character of the urine, and the action of the bowel.

3. Any tension of the sides of the opening must be previously attended to, and if cicatricial bands be present they should be divided by snipping them with scissors, a vaginal rest being inserted

subsequently and retained for some days. By this operative step absorption of cicatricial tissue is secured and tension prevented. This, however, is but rarely necessary, as any adhesive bands can be divided and freed at the time of operation.

4. The vagina should be douched with a 1 in 1000 perchloride of mercury solution for a few days before operation, and a moist tampon of boracic wool, which is changed daily, is inserted and worn for some forty-eight hours previously. The rectum is thoroughly emptied and washed out with a boric acid wash shortly

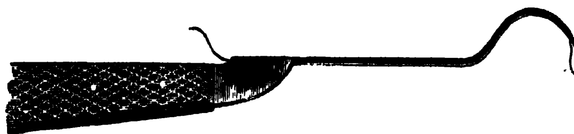


Fig. 560.—Tubular Curved Needle, Right and Left.

before operation. The exact steps of any operation for a vaginal fistula will entirely depend on its position, size, attachments to the bladder or rectum, as the case may be, or whether it communicates

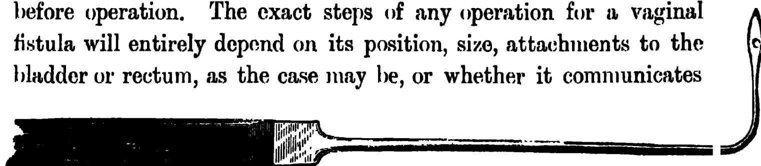


Fig. 561.—Rectangular Needle.

with the uterus and the situation of the opening into the uterine canal.

Instruments and appliances required:

Vaginal retractors * { Martin's, Sims', Lateral, Landau's, Olshausen's.

Uterine tenacula.

Long-handled double hook.

Long rat-toothed forceps.

Scalpels.

Several vesico-vaginal knives (straight and angular).

A few differently curved vesico-vaginal scissors; one with fine points.

Wire-adjuster and wire-twister.

Silver wire.

Silkworm gut and prepared catgut.

* See pp. 504–507.

Several torsion forceps—different lengths.
Several small sponges—dabs of gauze and sponge-holders.
Irrigation can and pipette.
Thigh-supports.
Bozeman's button-adjuster.
Short, straight, lance-headed, tubular and curved needles.
Needle-holders, long and short.

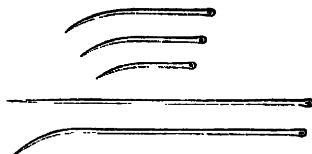


FIG. 562.—EMMET'S LANCE-HEADED NEEDLES.



FIG. 563.—VESICO-VAGINAL FISTULA KNIFE, STRAIGHT.



FIG. 564.—WIRE GUIDE.



FIG. 565.—VESICO-VAGINAL FISTULA KNIFE, ANGULAR.



FIG. 566.—VESICO-VAGINAL FISTULA FORCEPS.

OPERATION FOR CLOSURE OF SIMPLE VESICO-VAGINAL FISTULA.

First Step: Denudation of the Edges.—The patient is placed in a good light in the dorsal, knee-elbow, or Sims' position, according to the situation of the fistula. The dorsal I prefer.

At least three intelligent assistants and a nurse or two are required. The retractors and irrigator are taken charge of by one; the instruments by the second; a third assists the operator when necessary; while the nurses attend to the sponges.

The first step consists in freshening the edges of the opening by removal of a strip of mucous membrane from its entire circumference, taking care to extend the incision well into the angles of the

fistula. The tissue where the knife transfixes the mucous membrane is hooked up on a tenaculum, and put on the stretch. By care, in most cases, the ring of tissue desired to be removed can be taken away in a single circular strip. The mucous membrane of the bladder is avoided. The broader the raw surface is on the vaginal side, the better. Both curved scissors and knife are used. Where the edge of the fistula is thin and bevelled, the operator has to split the edges or extend the denuded surface on the vaginal wall. Bleeding is arrested by very hot irrigation and sponging, by torsion, or by fine gut ligature. If the precaution have been previously taken of dilating the vagina and rendering the uterus more mobile by division of any cicatricial bands, the cervix may be drawn down by a tenaculum, and the strain is thus taken off the edges of the fistula.

Second Step: Passing the Sutures.—The operator has ready at hand the strong blunt hook of Emmet, Emmet's lance-headed needles of the selected sizes, threaded at the ends with a loop of silk, and some fine-curved needles. He steadies the tissue with the tenaculum, and with the needle-holder enters the needle at about a quarter of an inch from the margin of the wound, pushing it forwards until it appears in the opening, when it is seized and drawn through. The vesical mucous membrane is carefully avoided. It is now entered at the corresponding point of the opposite side, and the needle-point is made to protrude on the vaginal surface at the same distance from the opposite margin of the fistula. The blunt hook or tenaculum is used to make counter-pressure by passing it under the needle-point, while the latter is pushed through any dense or resisting tissue. The silkworm gut or catgut is now drawn through the opening, and each thread is taken charge of by an assistant. If Emmet's loop be resorted to, it has been previously fixed to a thread of silver wire. When the needle has been passed, it is again seized and drawn through with the silver wire. Sufficient sutures are then passed, generally about four or five to the inch.

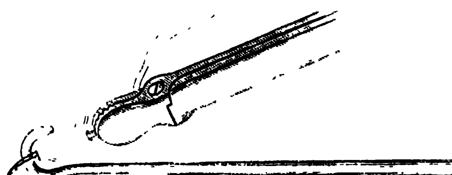


FIG. 567.—SHOWING USE OF BLUNT HOOK PASSING THE SUTURE. (Emmet.)

When all the sutures are passed, the operator again cleans the

wound of blood and arrests any bleeding from the pierced points. If simple gut sutures are used they are tied off separately. Silver sutures are secured either by simple twisting, perforated shot, or Bozeman's adjuster. Adaptation of the edges is secured by carefully drawing on the wire with a wire-catch and the use of a wire-

FIG. 568.—WIRE-CATCH

twister. If the surgeon should simply twist the wire, he must be careful of the amount of tension he places on the sutures.

After-Treatment.—A careful nurse is given charge. A soft self-retaining catheter is left in the bladder with a small tube attached, and a broad flat-bottomed cup is placed between the thighs. I

FIG. 569.—WIRE-TWISTER.

prefer to have the urine drawn off at regular intervals by a nurse. The patient lies on her back. The greatest care is taken as to the cleanliness of the catheters used, which are kept sterilized, as before directed (see Chapter on Asepsis). If a retained catheter be employed, it is withdrawn three times in the day and washed

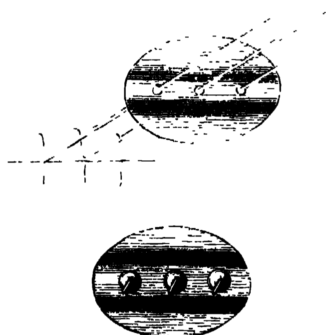


FIG. 570.—BOZEMAN'S ADJUSTERS.

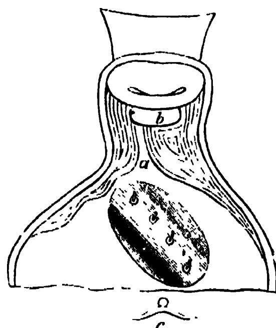


FIG. 571.—SHOWING BUTTON SUTURE CLOSING FISTULA. (Bozeman.)

freely out by forcing a stream of carbolized water, or weak formalin solution, through it with a syringe. Any stoppage in the flow of urine is at once attended to. The catheter should be curved beforehand to the shape best suited to the individual case, and a second

should always be ready at hand to replace the one removed, which is left in an antiseptic solution until required.

Opium is given to keep the bowel constipated. The vagina and bladder are washed out daily with some mild disinfectant. The sutures are not removed until the tenth day. The catheter is still used, and the woman is not allowed out of bed until the twentieth day.

Closure by flap-splitting.—Ferguson * (Manitoba) has performed an operation for vesico-vaginal fistula on the flap-splitting principle.

An incision is carried through the vaginal mucous membrane at a distance of one-eighth of an inch from the margin of the fistula, which completely encircles the aperture. The operator cautiously deepens this incision until he reaches the lining membrane of the bladder. Thus a circumferential flap of the vaginal mucosa is secured. By inverting this flap into the bladder, a roof for the raw surface is obtained, and is held in this position by a continuous suture of fine chromic gut, which is inserted so as to avoid the vesical wall. Thus a narrow strip of vaginal mucosa becomes part of the lining of the bladder. The artificial opening is now closed and water-tight, and the final step of the operation is the passage of silkworm gut sutures on the vaginal surface in the ordinary manner, the vesical mucosa being avoided.

Maclean suggests a plan for distending the bladder-wall in difficult cases of these higher vesico-vaginal fistulæ. Some eight or ten inches of rubber tubing are connected with an ordinary toy balloon by means of a short glass tube. The collapsed balloon is passed into the fistula through the bladder, and then distended with five ounces of warm sterilized water. The balloon is now drawn firmly into the fistula by means of the tubing, which is clamped. The freshening of the fistulous opening is thus facilitated.

RECTO-VAGINAL FISTULÆ.

These fistulæ are, as I have already said, often very difficult to find. Their presence is only discovered by the escape of fæcal gas or matter into the vagina.

Cullingworth has specially drawn attention to the occurrence of fistula, in connection with chronic suppuration of the adnexa, and he points out these typical forms: (1) Rectal fistula, due to the rupture of a suppurating dermoid into the rectum, six weeks after confinement. (2) Vaginal fistula, arising from purulent disease of the appendages of the right side. (3) Cervical fistula, due to ulceration of a suppurating dermoid into the cavity of the uterus in that situation. (4) Vesical fistula, arising from the rupture into the bladder of an abscess arising in connection with the appendages of the right side.

* *Brit. Med. Jour.*, February 24, 1894.

Whenever the edges of this fistula can be brought well together from the vaginal side, the operation of closing it should be performed from that side. The woman is placed in the lithotomy position. The rectum is thoroughly emptied and washed out with a warm solution of boric acid, and a sponge is carried to the sigmoid flexure so as to keep the part free of fæces during the operation. The steps are practically the same as in the vesico-vaginal procedure; but of the two the vaginal raw surfaces must be larger. It may be necessary to attack the fistula from the rectal as well as from the vaginal side. If so, the sphincters should be thoroughly dilated, and a smaller duckbill speculum used to expose the fistula. Sutures are thus introduced both from the vaginal and rectal sides. Goodell recommends the dissection of the vaginal mucous membrane for half an inch from the circumference of the fistula, in the form of a frill, which is inverted into the rectum, and the opening is closed both by rectal and vaginal sutures. The bowels are locked for fourteen days after the operation, though some operators prefer a daily evacuation. The after-care is the same as in other operations of a similar nature.

Ferguson's Operation.—As in the case of the vesico-vaginal plan, this surgeon obtains a circumferential flap from the vaginal surface, extending to, but not through, the mucous membrane of the rectum. The edge of the flap is seized with four pressure forceps inserted into the rectum, and a small pile-clamp is applied to it; the free portion of the flap external to the clamp is burnt off with the actual cautery. Interrupted sutures of silkworm gut are inserted and tied on the vaginal surface without grasping the mucous membrane of the rectum. The rectal clamp is then removed, a rectal tube wrapped with iodoform gauze is placed in the rectum, and the vagina is also packed with the same. Thus efficient coaptation of an extensively bared surface is obtained, resulting in ready union. The cauterization lessens the liability to septic infection, which is further guarded against by the iodoform packs. The rectal tube is not disturbed for a week, after which an enema is administered to secure an action of the bowels.

Vesico-Utero-Vaginal Fistula.

In vesico-utero-vaginal fistula, where the fistulous opening is in proximity to the cervix uteri, at the vaginal junction, the uterus must be freed from the bladder, and all cicatricial tissue dissected through, so as to free the uterus and render it movable. The shape of the denuded surface, and the direction in which the sutures are passed, will depend upon the size, shape and direction of the fistula. In the case of the small vesico-uterine fistula, we may determine

its existence by the injection of coloured liquid into the bladder, which will be seen escaping into the cervix. Should the fistula

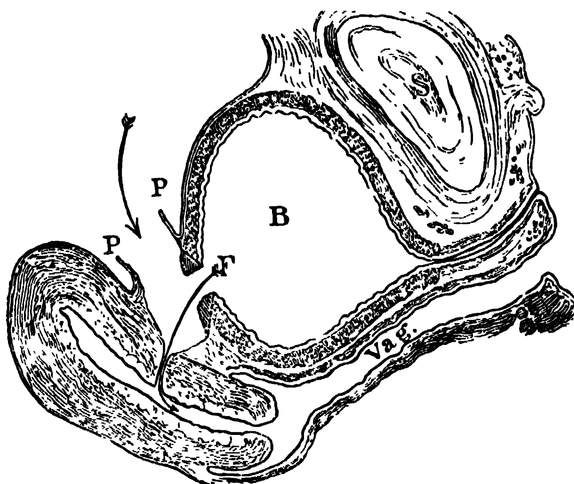


FIG. 572.—TREATMENT OF VESICO-UTERINE FISTULA BY SUPRA-PUBIC INCISION.* (From Howard Kelly. After V. Dittel.)
Vesico-uterine fold opened—fistula freed from the uterus and the margins united.

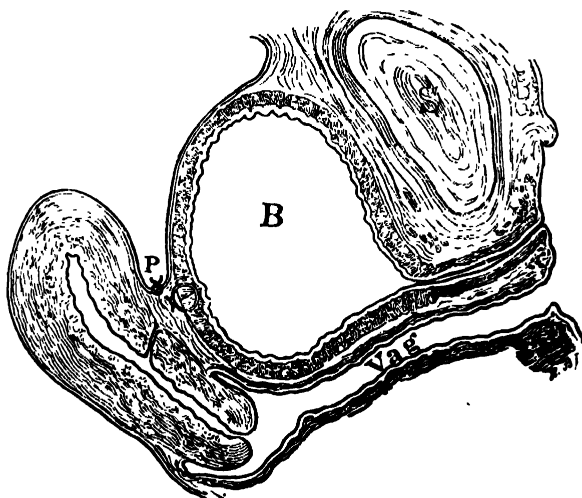


FIG. 573.—OPERATION COMPLETED. (From Howard Kelly. After V. Dittel.)

unfortunately be above the cervix, it may be necessary to open the

* See 'Operative Gynæcology,' vol. i., pp. 330, 331, by Howard Kelly.

abdomen, incise the utero-vesical fold of peritoneum, and separate the bladder from the uterus. The openings in the bladder and uterus are both freshened, and closed by interrupted silk sutures. Those passed in the bladder take in the whole wall with the exception of the mucous membrane. The bladder-opening is first closed. Before closure of the wound, the peritoneum is restitched to the uterine wall. Such an operation is fortunately rarely called for. Other surgeons reach the fistula by incision of the vaginal roof, carefully separating the bladder and uterus as far as the fistula, which is then closed by interrupted sutures, as in the last case, the uterus not being interfered with. Iodoform gauze is carried up between the uterus and the bladder. The vagina is loosely tamponned with the same. Fistulæ occurring lower down in the cervix are closed by entire denudation, including the cervical tissue and the edges of the vesical opening. The fistulous track thus bared is closed by silkworm gut sutures, which are introduced from the vaginal surface of the cervix.

Bozeman adopts an ingenious plan for previous stretching of the cicatricial tissue and the uterine ligaments. He employs vulvo-vaginal dilators of different sizes, which are worn after division of the cicatricial bands and adhesions, and are made of hard rubber, of oiled silk, or *taffetas de soie*, filled with sponge. He thus gradually dilates the vagina, and proceeds with division of any cicatricial bands. The vaginal wall and the edges of the fistula are thus prepared for approximation. He has also devised a special drainage support, for draining off the water directly from the fistula, and so prevents any passage of urine through the vagina for some time previous to the operation. The drainage support, of which there are two kinds, is connected by a tube with the urinal. We can bring about the same result by the use of a colporynter in the vagina, and gradual stretching of the canal, if preliminary division of the cicatricial bands be necessary.

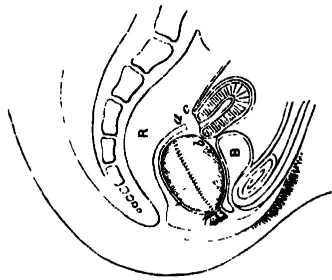


FIG. 574.—DILATOR IN POSITION.

In the case of very extensive fistulæ, special operative procedures have been undertaken by different surgeons. Martin, of Berlin,* performs a transplantation operation from the vaginal wall, forming a new floor for the bladder with the vaginal tissue, and closing the raw surfaces. Dudley, of Chicago,† in a case in which the anterior wall of the cervix had sloughed, making it impossible to close the fissure in the usual manner, denuded a strip

* *Zeitsch. f. Geb. und Gyn.*, No. 19, p. 394.
† *Chicago Med. Jour. and Exam.*, May, 1896.

of the mucous surface of the bladder from side to side for an inch above the posterior edge of the opening. The anterior margin of the fistula was next denuded on its vaginal surface, and the vesical mucous membrane was drawn forward and attached to it by silkworm gut sutures. Mackenrodt * closed a large vesico-vaginal fistula by carrying an incision across the fistula as far as the bladder, exposing its entire base. He next separated the bladder from the vagina freely, and, having denuded the edges of the opening, closed it by silkworm gut sutures. Over this the vaginal wound was closed, its edges having been freshened, and finally the uterus was fixed in an anteflexed condition so as to fill the gap and make a base against the newly closed opening.

Freund adopted the plan referred to in the text of suturing the abraded uterus into the fistulous opening and to the urethra, which was also involved. The fundus uteri was then resected, so as to leave an exit for the menstrual discharge, and in another complicated operation of the same nature a like plan was adopted, and in both cases with a fair degree of success. This method of utilizing the lips of the cervix uteri for closing fistulæ, has been adopted by different surgeons. Trendelenburg, operating in the inclined position, opened the bladder by a transverse supra-pubic incision wide enough to expose the pre-vesical space, and to make an aperture in the bladder sufficient to denude the edges of the fistulæ. This was done by removing a broad band of tissue from the mucous membrane of the bladder, and a narrower one from the vagina and the cervix. The edges were brought together by threading two needles on one suture, and bringing its ends into the vagina, where they were tied. The incision into the bladder was then closed, leaving an aperture for a T drainage tube, which was not removed till about the twelfth day.

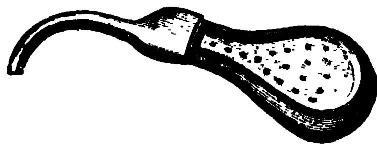


FIG. 575.- UTERO-VESICAL DRAINAGE SUPPORT. Dimensions of instrument: entire length, 4 inches length of body, 2 inches; width of body, 2 inches; thickness of body, ¾ of an inch; length of dish, 3 inches; superficial area of dish, 4 square inches.

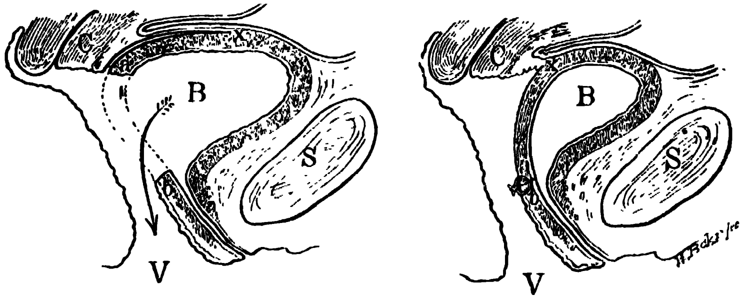
Howard Kelly's plan † is divided into four stages. The first consists of carrying a crescentic incision around the posterior two-thirds of the fistulæ, and detachment of the bladder from the vagina and cervix laterally as far as the peritoneum. The remaining anterior third of the fistula was then pared on the vaginal surface, the denudation being carried down to, but not including, the vesical and urethral mucosa. Two flexible urethral catheters were used to indicate and protect the ureters. The last step consisted in the union of the posterior line of the detached bladder to the anterior third of the fistula on its vaginal surface, silkworm gut being used, and the sutures being so passed as to turn the edge of the muscular wall of the bladder up into its cavity, thus directing the urethral orifices upwards. The vaginal opening was not closed.‡

* *Centralblatt für Gyn.*, No. 18, 1894.

† *Johns Hopkins Hospital Bulletin*, Feb., 1896.

‡ See p. 801.

Vaginal Enterocele and Varicocele.—Various authorities have from time to time reported cases of vaginal enterocele, but the complication is a rare one, and can only be relieved by operation.* Chéron describes a vaginal varicocele or a varix of the recto-vaginal



FIGS. 576, 577.—TO ILLUSTRATE THE DETACHMENT OF THE BLADDER ABOVE AND ITS ATTACHMENT TO THE UTERUS BELOW. (Howard Kelly.)

septum, associated with hæmorrhoids, and causing pain in the lumbar region. He suggests treatment by upward massage of the varix.

* *Centralbl. für Gyn.*, Leipzig, June, 1894; *L'Union Méd. du Canada*, July 1894; *Glas. Med. Jour.*, July, 1894.

CHAPTER XL.

AFFECTIONS OF THE URETHRA.

THE examination and exploration of the urethra have been already referred to, and in the chapter on the bladder Kelly's method of exploration is described (p. 812). Such an examination will be found to expose every portion of the urethral wall. The urethra can also be thoroughly dilated and examined in the manner I have said, and thus it can be explored by the finger (p. 812).

The following are the affections of the urethra:—

Congenital abnormalities.	Angioma.
Urethritis.	Condyloma.
Prolapse of the urethra.	Vegetations.
Urethrocele.	Vascular caruncle.
Dilatation.	Tumours.
Stricture.	Cancer.
Fistulæ.	Polypi.
Urethro-vaginal abscess.	Calculus, and foreign bodies in.

Congenital Abnormalities.—The external meatus may be displaced to the side, a ridge of mucous membrane projecting in the middle line. The urethra itself may be absent in whole or part. The vagina and bladder, in a case of Lagenbeck's, formed a common canal. Atresia of the urethra is very rare, but it has been noticed. In hypospadias a portion of the urethra is absent, and the urethra opens within the vagina, and there may be a common urinary and vaginal orifice. In epispadias the upper part of the urethral wall is affected, and associated with this malformation there may be separation of the labia and division of the clitoris, or other more extensive arrest of development in the symphisis, or upper wall of the bladder. As we have already seen, the position and direction of the urethra are altered by various complications, such as elongated cervix uteri, prolapse, tumours of the uterus, and cystocele.

Urethritis.—Perhaps the most frequent cause of urethritis, apart from injury, catheterization, and vulvitis, is gonorrhœa. In the latter case, there is the characteristic everted, swollen, and inflamed meatus, and round the orifice are minute ulcers, excessively painful, and pus constantly is seen filling the urethral orifice. The acute attack generally passes into a chronic form, which may be diffuse or circumscribed. In the former, small abscesses occur, involving Skene's glands, and the swelling in the anterior urethra is diffuse. In the latter, the symptoms are not so severe, and there is but slight discharge. (See chapters on the Vulva and Vagina for treatment.)

The treatment of chronic urethritis is conducted on the same lines as those laid down for vulvitis and vaginitis. Applications of ichthyol may be made daily to the urethra. Any raw surfaces should be touched with a solution of nitrate of silver (20 grs. to the ounce).

Prolapse of the Urethra is very rarely met with. Care must be taken not to mistake the red and everted mucous membrane for a urethral growth. Efforts at replacement should be tried with the parts thoroughly cocainized, or with the patient under an anæsthetic. Should this fail, the prolapsed portion must be removed either by knife, scissors, ligature, or galvanic wire. Hæmorrhage has to be controlled by a tampon and T-bandage. Emmet's plan of treating prolapse of the urethra is to make an opening in its posterior wall similar to that described in the button-hole operation. The prolapsed tissues are drawn through the slit from before backwards. A sound is carried into the urethra to place it on the stretch. Sutures are then introduced 'entirely through the flaps in the urethra, so as to transfix the lining membrane along the edges of the wound; the excess of tissue is then removed, and the opening closed.'

Urethrocele.—There is a difference between simple prolapse of the urethra and true urethrocele (Emmet), in which latter affection there is both shortening and sacculation. This sacculation, Bozeman explains, is due to contraction at or near the meatus, and its consequent dilatation and bagging above the constriction, and the retention of urine in the urethra. Emmet, on the other hand, associates urethrocele with injury to the urethra, occurring either in too rapid or too tedious a labour. The head in its advance pushes the loose mucous and submucous tissues of the upper part of the urethra into that portion below the pubic arch, and thus dilates it.

Cicatrization of either end of the urethra may occur with resulting sacculation of the intervening portion of the canal. Such conditious of prolapse or true sacculation require careful examination on the part of the surgeon, so that he may not confound the swelling with a tumour or vesical enlargement, or look on it as a mere secondary consequence of either a rectal or uterine affection. In urethrocele, Emmet introduces a block-tin sound into the urethra. With this the prolapsed tissue of the vesical end of the urethra is pushed back into the bladder. The centre of the urethrocele is steadied with a tenaculum while the sound is cut down on with bent scissors. A fairly free incision is made, avoiding the neck of the bladder or the meatus urethræ. The excess of tissue entering into the urethrocele is now cut away, but sufficient is left to cover the sound. The sac is thus obliterated. The urethra is drawn out with tenacula to its complete length, and with fine interrupted silk sutures the vaginal and urethral mucous membranes are brought together. The urethro-vaginal fistula thus made is not closed until the urethra is restored to nearly a normal condition.

Abscess in the Urethro-Vaginal Septum.

T. S. Cullin has accurately described the ætiology, symptoms and pathology of this affection.*

Ætiology.—After reviewing the anatomy of Gartner's ducts in the urethro-vaginal septum, he refers to the researches of Rieder, Doran, and others, proving that there are remains of the ducts in the vaginal septum, so also that Skene's tubules, which are situated just within the urethral orifice on either side, may be the remains of Gartner's duct (Kock and Böhm). The possible causes of the saccular abscess found in the saccular distension of the urethro-vaginal septum are:—

1. Congenital cysts or those occurring in the new-born. The latter variety has been mentioned by Englisch, who found that in new-born children small oblong cysts are occasionally present in the urethra near its orifice. He suggests that these may in after-life increase in size, and give rise to the above condition.

2. A true urethral diverticulum where all the urethral coats take part. This is due to the wall becoming weak at one point (Lannelongue, Priestley).

* *Johns Hopkins Hospital Bulletin*, 1894.

3. Accumulation of secretions in a urethral gland.

4. Dilatation of a lacuna of Morgagni, probably due to inflammation, closure of its orifice, and subsequent distension with secretion (Winckel).

5. Dilatation and possible occlusion of Skene's tubules (Böhm).

6. Arrest of calculi in the urethra, with a diverticulum forming to accommodate the same (Chéron, Piedpremier).

7. Traumatism, as a kick, or injuries during labour. Here an abrasion of the mucous membrane takes place, and the urine gains access to the small pocket, decomposes, and sets up an inflammatory process (Duplay).

8. A suppurating cyst situated in the urethro-vaginal septum, and afterwards bursting into the urethra (Hermann).

Symptomatology.—It may be found in persons of any age (Chéron)—more likely between thirty and fifty. The symptoms are painful micturition, with discharge of ammoniacal urine or pus.

About this time a swelling is noticed in the vaginal vault. It is usually situated in the mid-line about 1 to 2 cm. behind the external orifice of the urethra. The tumour varies in size from a marble (Routh) to a hen's egg (Tait), is tender and fluctuant. On pressure it diminishes in size, and discharge of ammoniacal urine or pus from the urethra follows. A catheter introduced along the anterior wall of the urethra will enter the bladder without difficulty, and usually clear urine escapes. If introduced along the urethral floor with its point directed downward, it will enter the sac cavity. The patients are usually in good health and give no history of chills.

On changing from a sitting to a standing posture there will often be an escape of the sac contents, the first intimation to the patient being that the clothing is moist. Coition may also cause a discharge of the fluid (Giraud). In one case, on pressure the contents escaped into the bladder instead of passing out of the urethra (Santesson). Where the discharge is irritating there is excoriation of the external genitals and thighs. The sac opening in the urethra will admit as a rule a No. 6 catheter. The sac may have smooth glistening walls (Hey), be lined by squamous epithelium (De Bary), or have a ragged appearance with trabeculæ traversing its cavity (Routh). Its contents are usually decomposed urine and pus cells, and where the sac contains calculi, blood cells are also found (Chéron and Giraud). In one of the cases where calculi were present the interior of the sac presented an ulcer at its most

dependent part, which was probably due to mechanical injury produced by the calculus.

Treatment.—This consists in the removal of the redundant tissue *in toto* by an elliptical incision, then a slight inversion of the mucous membrane, and closure by silk sutures. The catheter should be passed three times daily for three to four days, and the patient should afterwards be advised to urinate in the genu-pectoral position for a week longer. In introducing the catheter, care should be taken to pass it along the anterior urethral wall.

Fistulæ of the urethra must be closed by operation (see Chapter XXXIX.).

Both *venous angioma* and *vegetations* are differentiated from urethral caruncle by their want of sensitiveness.

Polypi are readily removed.

CONDYLOMA.—Pedunculated condylomata, similar to those found elsewhere, grow at the external meatus. They can be snipped off and the cautery applied.

URETHRAL CARUNCLE—*Situation and Nature.*—This most painful growth is found at the orifice of the meatus. It consists of a mass of hypertrophied papillæ, freely supplied with bloodvessels and nerves. The papillæ are surrounded by connective tissue, and are covered by squamous epithelium.

Symptoms and Physical Signs.—The patient generally consults us for great pain and frequency in passing water; the former at times is occasionally excruciating. She has to avoid coitus, and if the case be an aggravated one there is pain in walking, and the slightest movement causes distress. The woman's suffering is written on her countenance. She is anxious, depressed, nervous, and hysterical. On making an examination, the cause of the suffering is at once apparent in the little raspberry-red growth or growths which are seen, either sprouting from or occluding the urethral orifice. These may be very small (the largest I have seen have not exceeded in size a small filbert), or they may grow to the size of a pigeon's egg. The characteristic feature of the affection is at once demonstrated by the intense pain on touching the growth, even with a little cotton-wool rolled on a probe. When incompletely anæsthetized the woman will still wince if the tumour be manipulated. Caruncle may occur at all periods of life, both in married and single. Goodell thinks that the pressure on the urethral veins during the arrest of the head in labour may predispose to the occurrence, but I have

seen carunculæ in virgins. Irritating discharges and habits of uncleanliness are predisposing causes.

Prognosis.—The great tendency to recurrence should be remembered. This applies more to the sessile variety than to the pediculated. When multiple, if they be pediculated, there is the best chance of complete cure.

Treatment.—There is but one satisfactory treatment for urethral caruncle, viz. removal by forceps and scissors, and the subsequent application of the actual cautery (Paquelin's), or the galvano-cautery knife or wire may be used. We must be prepared for smart bleeding, which may have to be controlled by tampon and compress. If an operation will not be submitted to (which is exceptional), the topical application of such agents as carbolic acid, nitric acid, and chromic acid may be tried in order to deaden sensibility.

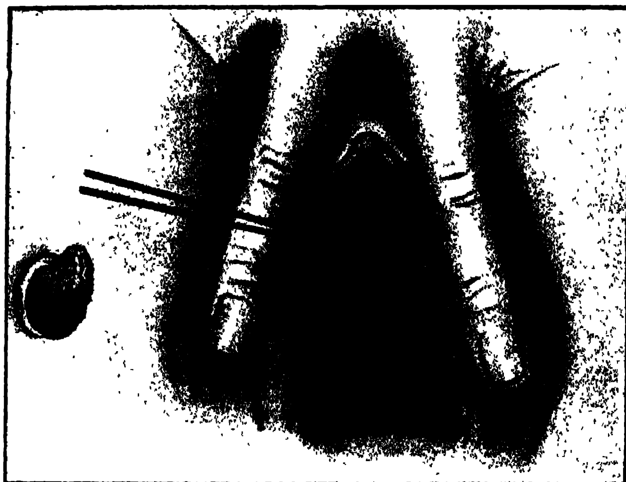


FIG. 578.—URETHRAL CARUNCLE.

Malignant Disease and Tumours.—Cases of *sarcoma, epithelioma, melanosis,* and *rodent ulcer* are occasionally met with. Temporary arrest or limitation of the disease is the most we can hope to effect by treatment in these cases. The galvanic knife, Paquelin's cautery, the curette, and such caustics as chloride of zinc, lactic acid, chromic acid, will be found to be the best methods of dealing with these growths.

Stricture.

Stricture of the urethra may be of congenital origin, or follow—

Traumatism in labour;
Cauterization;
Gonorrhœa;
Vulvar lupus.

Hermann has reported a case of lupus limited to the urethra, but this affection is very rare.

Stricture must be treated either by rapid and forcible dilatation or by gradual dilatation. If the former be practised, care must be taken not to injure the neck of the bladder so as to cause incontinence.

No permanent trouble has ever arisen in any case of urethral dilatation in my practice. Emmet has recorded two cases of incontinence in eleven cases of dilatation; Noeggerath two cases of incontinence out of seventy-five.

I prefer my metal uterine dilators for this purpose to any other. They are safer than Hégar's, and the graduated double bulb ends are easier of introduction. For incontinence of urine with pain, whether it be caused by urethral growths, extraneous pressure, or vesical irritation, the greatest relief will be found frequently to follow simple dilatation of the urethra. This can readily be effected in the manner already described. The practitioner will do well to use gradual dilatation, and exercise all possible caution to avoid laceration of the neck of the bladder. Emmet insists on the superiority and safety of his method of exploration by incision.

Should the stricture be due to cicatricial contraction, the urethra should be thoroughly cocainized, and the cicatrix freely incised, or it may be necessary (Kelly) to resect the lower wall of the urethra with the cicatrix, closing the wound with fine interrupted sutures and keeping a retained catheter in the bladder.

Dilatation of the Urethra.—Should the urethra from any cause be permanently dilated, as the result of forcible dilatation or laceration of the external meatus, various plans have been suggested to cause contraction. Pawlik,* for example, draws the urethral orifice forwards and to the side, and then denudes a strip two centimetres long in the cleft, suturing the edges so as to fix the urethra in its new position. When these sutures are removed, the other side of the urethra is drawn upwards and outwards, and a similar

* *Wien. Med. Wochenschr.*, 1883.

denudation is made. The object is to give the urethra a bend forwards, and to flatten the posterior wall against the anterior by traction.

Gersuny,* having isolated the urethral canal by dissection to the neck of the bladder, twisted the urethra on itself, and having thus formed a series of spiral folds, secured it in this form permanently by sutures. On the other hand, relief has been afforded (Frank) by contracting the urethra by excision of a portion of it for the entire length of its posterior wall to within a centimetre of the internal orifice. Here, by an elliptical denudation of the vagina round the neck of the bladder, and the approximation of the margins by sutures, an artificial impediment to the escape of urine from the bladder is secured, which assists the effects of the excision of the urethra.

Physiological Rest to the Bladder.

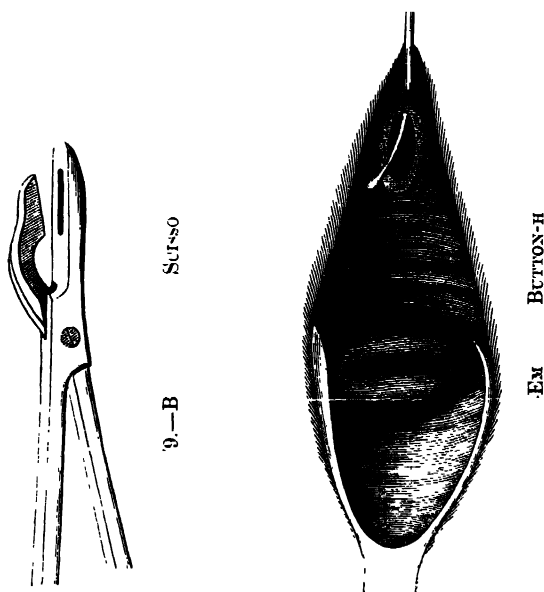
Button-hole of Emmet.—Emmet devised and advocated an operative procedure for exploration of the urethra, by means of which the entire canal can be explored and any local treatment applied. It is safe, and can be performed without difficulty. It does not interfere with the control of the urine. It affords physiological rest to the bladder in cases of cellulitis, cystitis, and in other cases of persistent bladder irritability. He calls this step 'the button-hole operation.' It is performed thus: The patient is placed on the left side under an anæsthetic, and a Sims' speculum is introduced so as to expose thoroughly the anterior vaginal wall. Emmet himself uses a 'button-hole scissors,' the long blade of which takes the place of a urethral sound and has an aperture through which the vaginal blade passes, the latter being so curved as to avoid the urethral orifice in the incision.

Under any circumstances, it is better to introduce a sound of sufficient size to stretch the urethral tissues. A knife may then be used. The tissues on the vaginal side of the urethra are incised down to the sound, midway between the urethral orifice and the neck of the bladder: this latter must be carefully avoided. The line on the vaginal side is a third more than that on the urethral, this extension being mainly on the vesical side of the incision. Through the incision thus made we can explore the urethra and the entrance to the bladder. Emmet, as I have said, employed this method for exploration, but such an incision, for this object solely,

* *Centralb. für Chir.*, 1889.

will be rarely necessary. Should it be so, after exploration, we close the wound immediately by inserting sutures, which include the urethral mucous membrane, and pass from one side of the wound to the other, the lips being well everted by a tenaculum. The patient is kept in bed for over a week, and the passage of a catheter is avoided if possible.

On the other hand, if our object be to maintain the patency of the opening, so as to secure physiological rest for the bladder, the edges of the urethral mucous membrane are united to the vaginal surface by means of interrupted sutures of silkworm gut or carbo-



lized silk. The edge of the urethral tissue is drawn out and covered by the vaginal membrane, and both are neatly united, and granulation, if possible, prevented. The patient is kept in bed, the parts are douched with warm carbolized water, and after the douche or sponging, the wound is smeared with some mild astringent ointment or salve; this treatment is continued for some time. If the opening be no longer indicated, it is closed in the same manner as a vesico-vaginal fistula.

Calculi.—Calculi in the urethra may be dealt with either by dilatation with forceps, or by a vaginal incision, or, if they be soft, they may be crushed and the débris removed.

CHAPTER XLI.

AFFECTIONS OF THE BLADDER.

Affections of the Bladder.

Malformations.		
Hyperæmia.		
Cystitis.		Simple, catarrhal, septic.
,,	acute.	
,,	chronic.	Traumatic, post-operative.
		Gonorrhœal.
Calculus.		Tubercular.
		Puerperal.

Tumours :-

Papilloma.	Sarcoma.
Myoma and fibromyoma.	Carcinoma.
Adenoma.	Dermoid.
Myxoma.	

Affections of the Ureters.

Double ureter.	Calculus.
Ectopic ureteral orifice.	Stricture.
Ureteritis.	Ureteral fistula.
Hydro-ureteritis.	Ureteral prolapse.
Pyo-ureteritis.	Wounds.

The reference to any of these vesical affections in this work must necessarily be brief. Still in any work on gynæcology it is essential to include a description not only of modern methods of diagnosis, but also of the more commonly occurring diseases which the surgeon is daily brought into contact with, and to endeavour to succinctly summarize their treatment.

Examination of the Bladder and Ureters.—The female bladder may be examined by any of the following methods :—

(*a*) *Percussion.*—The over-distended bladder can be detected by careful percussion.

(*b*) *Palpation.*—It may be palpated bi-manually with the index-finger of the left hand in the vagina, and the right hand placed supra-pubically. Palpation is assisted and bi-manual examination is best conducted by the emptying of the bladder beforehand. It may be further facilitated by placing the patient in the knee-elbow position. A tumour or stone in the region of the neck of the viscus may thus be felt.

(*c*) *By the Sound.*—With a sound in the uterus and another in the bladder, the size and situation of a tumour—as, for example, a displaced ovary or dermoid cyst—may be determined on.

(*d*) *Dilatation of Urethra.*—The urethra may be dilated with graduated dilators until the finger can be passed, and the neck of the bladder, as far as the ureteral line, explored. With the finger of the right hand in the bladder, and the left in the vagina, circumscribed growths may be felt between the two. This operation has to be cautiously conducted under an anæsthetic, and the maximum degree of dilatation should be arrived at slowly.

Kelly says, 'The time has for ever gone' for this procedure. This may be so for the skilled cystoscopist who is familiar with the use of the cystoscope; but it is not applicable to many surgeons who have not this appliance or Kelly's instruments, and who have to aid their diagnosis by such an exploration as that mentioned in the text.

(*e*) *Cystoscopy.*—The electric cystoscope of Nitze may be used. This examination requires care in its application, and practice both on the living and dead subjects and on artificial bladders.*

(*f*) *Incision through Vagina and Urethral Dilatation.*—Emmet's plan, by dilatation of the urethra and incision through the vagina, has been already referred to. It is, perhaps, the most preferable method to adopt in certain cases of tumour of the neck of the bladder which have to be removed by operation.

(*g*) *Howard Kelly's Method of Direct Examination of the Female Bladder.*—Howard Kelly's method of direct examination of the female bladder and ureters with elevated pelvis, and catheterization of the ureters, is now well known. The importance to the gynæcologist of his exact ureteral examination cannot be over-estimated. I have already, in discussing the surgical treatment of uterine fibromata, referred to the secondary renal effects which follow, both from pelvic inflammations and tumours pressing upon and involving

* See p. 826.

the ureters, as also their implication during the different operations for hysterectomy, and to the anatomy of the ureters and their course. The fact that they are accessible to exploration was demon-

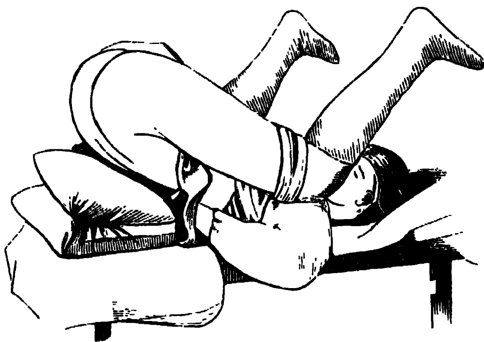


FIG. 581.—DORSAL POSITION OF THE BODY FOR EXPLORATION OF THE BLADDER AND URETER IN HOWARD KELLY'S METHOD.

strated by Kelly. For the landmarks for finding the orifice of the ureter and its palpation, the reader should refer to pp. 48, 824.

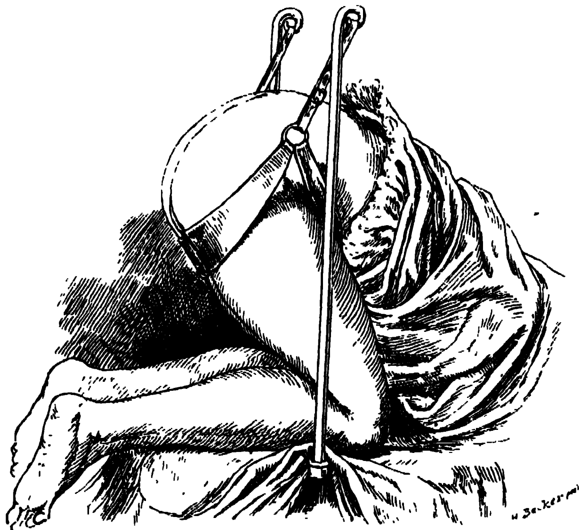


FIG. 582.—PATIENT SUPPORTED WITH KELLY'S SUSPENDERS IN THE KNEE-ELBOW POSITION FOR EITHER CYSTOSCOPY OR PROCTOSCOPY.

In using Kelly's cystoscope, either the dorsal or knee-breast position may be selected. Perhaps the latter is, on the whole, the one

now more generally availed of, but much may depend on the nature of the case, the form of growth or the position of the diseased area, or some displacement of the bladder by extra-vesical effusions or growths.

'The genu-facial position is indispensable in those cases in which, owing to disease, the bladder will not balloon out in ordinary posture; but Kelly has frequently succeeded in the dorsal and left semi-prone positions if the pelvis were moderately elevated.'

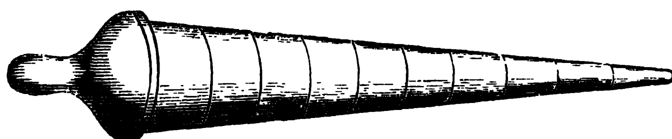


Fig. 583.—Kelly's Urethral Calibrator (the lines indicate the diameter in millimetres).

'It has been my fortune,' says Kelly, 'to work out a simple method which exposes the whole inner surface of the bladder, and the ureteral orifices, to a direct inspection without any intervening fenestra or mirror. By this method any gynæcologist, after a little practice, should be able in almost every case to catheterize either ureter within a few seconds after the introduction of the



Fig. 584.—Speculum and Obturator (two-thirds natural size).

speculum. The bladder exposed in this way may be inspected with as much ease and more directly than the larynx, the posterior nares, or the fundus oculi.

'The following instruments and accessories are required for the examination: a female catheter; a series of urethral dilators; a series of specula with obturators; a common head mirror, and a lamp,

Argand burner, or electric light; long delicate mouse-toothed forceps; suction apparatus for completely emptying the bladder; ureteral searcher; ureteral catheter without a handle; several bran bags or an inclined plane for elevating the pelvis.

'The bladder is first emptied as completely as possible by the catheter. A residuum of from one to several teaspoonfuls of urine always remains, even though the bladder is evacuated with the patient in a standing posture. In order to determine the proper dilator to begin with, I calibrate the meatus urinarius externus by means of a slender metal cone 10 centimetres long, marked in a graduated scale from its point, 2 millimetres, to its upper end, 20 millimetres in diameter. The calibrator is pushed into the urethra as far as it will readily go, and the marking at the meatus externus noted. A dilator of the diameter indicated by the calibrator is then passed through the urethra by holding the handle at first well above the level of the external meatus, upon which the point rests, and carrying the dilator on through the urethra and into the bladder by a gentle sweeping curve of the hand downward and inward toward the urethra.'

Kelly uses sigmoid-shaped conical dilators graduated in millimetres like the specula, and flattened in the centre for the purpose of grasping. He estimates the urethral calibre at 2 centimetres in diameter and 6 in circumference.

'By introducing the dilators as they occur in the series, the average female urethra can easily be dilated, up to 12 millimetres in diameter with only a slight external rupture. He has never seen a tear more than 2 or 3 millimetres in length and from 1 to 1½ in depth.

I do not here figure the special dilators of Kelly. Those figured at p. 85 will answer every purpose.

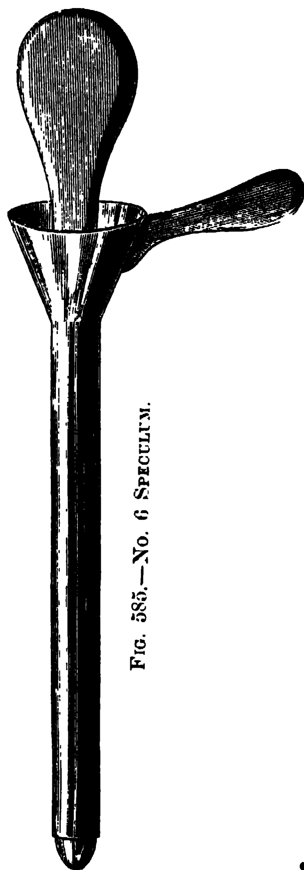
'As soon as a dilatation of from 12 to 15 millimetres is reached, a speculum of the same diameter as the last dilator is introduced, and its obturator removed. Boro-glyceride is the best lubricant. I commonly use the vasol iodine as a lubricant for appliances.

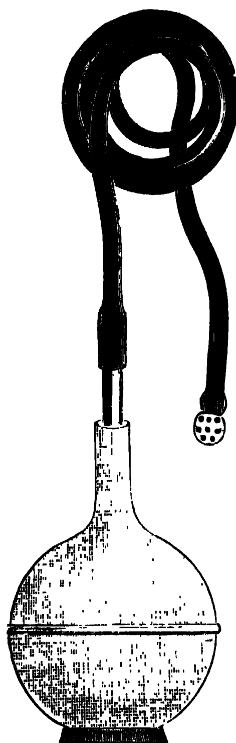
'The *hips of the patient are now elevated* on the cushions, or on a short inclined plane, 26 or 30, or even 40, centimetres (8 to 12 or 16 inches) above the level of the table (Fig. 581), that is if the dorsal position be chosen, or she is placed in the knee-breast position and supported on it.

'There are sixteen specula (Figs. 584, 585), varying from 5 to 20 millimetres in diameter, the successive sizes increasing by 1

millimetre. The specula are cylindrical, 9½ centimetres long, and each is provided with a conical mouth to assist in reflecting the light into the bladder. Each speculum is fitted with an obturator (Figs. 584, 585). The calibre is marked in millimetres on a little handle at the side of the speculum.

'The examiner now puts on the head mirror and prepares to


Fig. 585.—No. 6 Speculum.


Fig. 586.—Howard Kelly's Sucker.

inspect the bladder. An electric drop light, an Argand burner, a lamp, or a candle in a dark room, is held close to the patient's symphysis pubis so that the light can be easily caught by the head mirror and reflected into the bladder. A good direct light from a window will also suffice.

'Upon withdrawing the obturator, the pelvis being elevated, the

bladder becomes distended with air, and by properly directing the reflected light all parts of its interior are accessible to a direct inspection.

'If a pool of urine remain in the bladder, it should be withdrawn by means of a simple suction apparatus (Fig. 586). If there be a residuum of not more than 2 or 3 cubic centimetres, it can easily be removed by little balls of absorbent cotton grasped with long, delicate mouse-toothed forceps, the teeth of which are slightly recurved. The facility with which foreign bodies are removed from the bladder by this method can be demonstrated by dropping a pledget of cotton into the bladder—it can be seen with the utmost ease, picked up, and removed without difficulty.

'The posterior wall of the air-distended bladder lies 2 to 5 centimetres distant from the anterior wall, and over this white background, which first presents itself to the eye of the observer, is visible a beautiful network of branching and anastomosing vessels. The veins accompanying the arteries are easily distinguished by their dark colour. The larger vessels evidently come to the surface from the deeper layers of the bladder, when they branch stellately, divide, and anastomose.



FIG. 587.—SHOWING THE USE OF URETERAL SEARCHER BEFORE CATHETERIZATION. The light is thrown on the mirror by an electric lamp held by the assistant.

'To introduce the speculum, it is grasped as shown in Fig. 587, and the obturator is kept from slipping back into the cylinder by a decided pressure with the thumb, continued until the end has entered the bladder. The urethra, wiped clean with a boric-acid solution, is exposed by an assistant holding the buttocks and the labia well apart, while the point of the speculum, coated with the boro-glyceride solution, is applied to the urethral orifice, and pushed through the urethra into the bladder with a gentle sweep around the pubic arch. The handle of the speculum is now firmly grasped, while the obturator is withdrawn with a slight rotary motion. If the internal urethral orifice is drawn well into the pelvis by the posture, the urethra is so much curved that there is danger of

injuring it by pushing the speculum hard against its posterior wall; this must be avoided by introducing the speculum in a decided curve. The moment the obturator is taken out the air rushes in and the bladder is dilated and ready for the inspection.

'If the bladder does not expand in this way the examiner will usually find that the patient has assumed a faulty position, and as soon as this is corrected the expansion occurs.

'If the patient is in the knee-breast position the examiner sits on a stool with his eyes a little below the level of the urethra, grasping the handle of the speculum, which is turned upward, and he should wear the head mirror over the same eye he uses at the microscope.

'The assistant now holds the electric droplight close to the end of the sacrum, which is protected from the heat by one or two towels, and the lower margin of the head mirror is drawn away from the face and turned until the reflected light spot falls within the bladder.'

By dropping the handle of the speculum decidedly, its inner end is raised, and the vault or summit of the bladder is brought into view, and every part of the organ inspected by moving the end from side to side. By elevating the handle decidedly, the floor of the bladder is examined in the same way, and then by moving it to the right, the right and left walls come into view.

Kelly insists on the extreme care with which the aseptic steps of catheterization must be carried out, the same care 'in the aseptic technique equal to that of any surgical procedure.' This refers equally to the sterilization of the instruments and the avoidance of contamination, either with the appliances or the hands of the examiner or his assistant. The ureteral end of the catheter is not touched, but is guided up to the speculum, the lumen of which has been carefully sterilized. If a flexible ureteral catheter be used, the orifice of the ureter is localized, and kept in view by means of the speculum. The silk catheter, already sterilized, and lubricated in a boro-glyceride solution, is now taken hold of by its end with the sterilized fingers, or, as Kelly recommends, sterilized rubber finger-stalls. Under all circumstances, careful sterilization is carried out. The catheter is now guided to the ureteral orifice. During this manipulation the other end of the catheter is supported on the shoulder of the examiner. When it is introduced, the speculum is withdrawn, and care is taken that the patient does not by movements in position pull the catheter from out of the ureter. The ureteral catheters are 30 centimetres in length, and the renal 50,

that is, 12 and 20 inches respectively. They are made of woven silk, coated and rubbed down to a highly polished surface.

The catheters are kept in sterilized tubes, closed at both ends with sterilized cotton. The metal ureteral catheter is 12 inches long (29 centimetres) and $2\frac{1}{2}$ millimetres in diameter. Its shape and character is shown in the drawing. It is made in two sizes. The more convenient for passing measures a millimetre and a half in diameter. There are three oval eyes at the extremity of the catheter. The bougies used by Kelly are made either of metal or hard rubber. Some are of the same shape as the catheters. They are two millimetres in diameter, and some twenty inches in length. Some of the hard rubber ones are so grooved at the tip that they hold a little dental wax, so that when the bougie comes in contact with the calculus, the scratch on the surface of the wax can be seen with a lens. A silk renal catheter, tipped with wax, effects the same object. The dilating catheters are

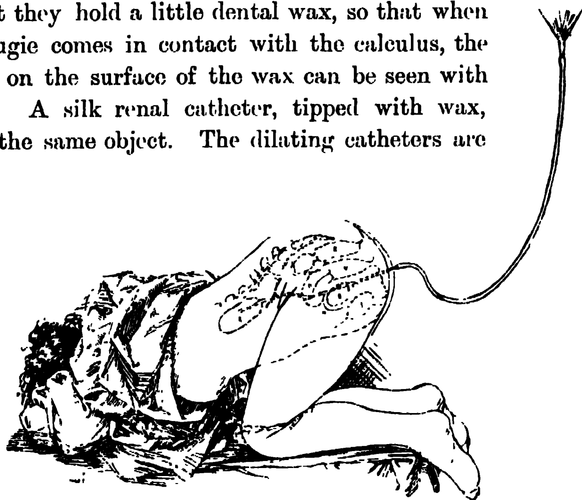


Fig. 588.—Irrigation of the Ureter in a Case of Pyo-ureteritis. By changing the position of the body from the genupectoral to the horizontal, the antiseptic (boric) solution flowed in and out. (Howard Kelly.)

metal tubes, nickel plated, and have a curve at either end, terminating in a tapering conical blunt point. To the outer end of the catheter a rubber tube can be attached.

'By elevating the handle of the speculum, the field of vision sweeps over the base of the bladder until in some cases the region of the inter-ureteric ligament comes into view, often marked by a slightly elevated transverse fold or a distinct difference in colour. By turning the speculum thirty degrees to one side or the other and looking sharply, a ureteral orifice is discovered. While inspecting the ureter I have frequently observed little jets of urine ejected at

short intervals, like a miniature fountain; in pathological cases I have seen pus and blood flowing from one ureter while the other discharged normal urine.

'The ureteral orifices and their surroundings are not constant in appearance. Sometimes the orifice appears as a dimple or a little pit, or, in inflammatory cases, as a round hole in a cushioned eminence; at other times as a round hole with the point directed outward; again, it may be scarcely visible even to a trained eye, appearing as a fine crack in the mucosa, and occasionally is so obscure as to be recognized only by the jet of urine as it escapes, or by a slight difference in the colour of the mucous membrane at that point. In rare cases it has the form of a truncated cone with gently sloping sides; this appearance is most apt to be developed in the knee-breast position.

'The bladder mucosa is usually of a slightly deeper rose colour around the ureter, and in the presence of an inflammatory process it even appears deeply injected.

'In the direct inspection the ureteral orifice always appears to lie nearer the urethra than one would anticipate. This is a result of the illusion produced by the foreshortening of the base of the bladder.'

Catheterization and Exploration of the Ureters by Howard Kelly's Method.

Appliances required.

'Two Kelly's ureteral catheters.
'One small calibre female catheter.
'One syringe, with a graduated barrel, of 4 or 5 oz. (120–150 c.c.) capacity.
'Eight ounces of a decided blue aniline solution.
'One Sims' or Simon's speculum.
'Two minim or cubic centimetre graduates of about 60 minim capacity.

Preparation of Patient (*see p.* 815).

'Many patients can be catheterized without anæsthesia. The buttocks should be brought to the edge of the table, and the legs flexed upon the abdomen. Bran bags or an inclined plane are used to elevate the pelvis. The operator then catheterizes the bladder. This urine is set aside in a conical glass vessel for comparison with that to be obtained from the kidneys.

'By careful palpation the ureters are located anteriorly through the vaginal wall, noting especially whether they are well forward under the bladder, or, as often found, abnormally far back in the pelvis.

Howard Kelly's Appliances for Ureteral Catheterization.



Fig. 589.—Ureteral Catheter with Reduced Handle.



Fig. 590.—Ureteral Catheters without Handles.

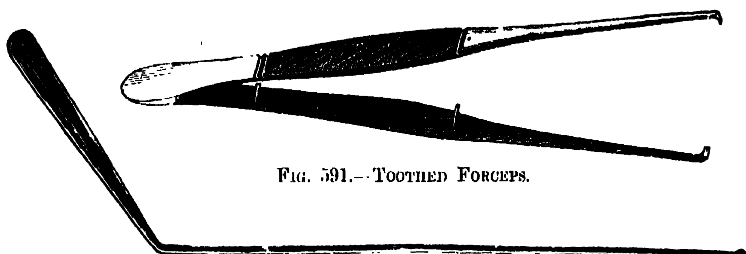


Fig. 591.—Toothed Forceps.

Fig. 592.—Ureteral Searcher.



Fig. 593.—Urine Collector.

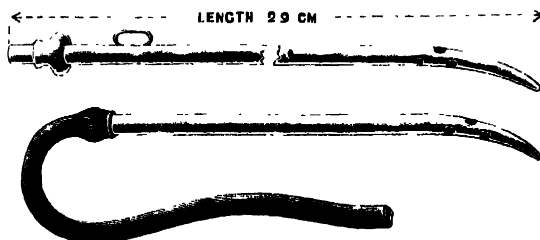


Fig. 594.—Hard Ureteral Catheters.

Steps of Method.

'The bladder is next distended with from 5 to 7 ozs. of the aniline solution. The posterior vaginal wall is retracted with a speculum, exposing the anterior wall up to the cervix, while the bladder is being injected.

'The object of this distension of the bladder is twofold: in the first place it does away with all the rugosities of a contracted bladder, which hinder catheterization, if they do not render it impossible. The only rugosities left are the prominences on either side, through which the mouths of the ureters open into the bladder by a little slit, running obliquely backward in a line with the course of the ureters.

'The second reason is well exhibited pictorially by Professor Pawlik, who was the first to demonstrate that the curved folds which cross the anterior vaginal wall out to the lateral walls and around toward the cervix are valuable landmarks in finding the ureters, which lie parallel to and just above them. These are appropriately called for this reason the "ureteral folds." They are brought out distinctly by moderate distension of the bladder.

'An assistant should determine that the catheter is clear by placing the end in water, and blowing through it without touching it with his lips. The metal plug, attached by a short chain to the catheter, is coated with a little vaseline, and inserted in the outer end, thus keeping the aniline solution from filling the lumen of the catheter when it enters the bladder.

Passage of Catheters.

'*In order to carry the ureteral catheter or sound over the brim of the pelvis, it is not necessary to use a flexible instrument.* This can be effected by first filling the bladder with sufficient fluid to distend its folds and introduce the catheter into the ureter, and then drawing off all the contents of the bladder; a finger introduced into the rectum high up gently lifts the catheter, and assists it over the brim and on up into the abdomen. This manœuvre is rendered possible by the loose cellular tissue in which the pelvic organs lie allowing a wide displacement of bladder, ureter, and broad ligament without injury. The contracted bladder can be lifted up, while it is impossible to displace the full bladder in this way.

'It is now evident that if clear or straw-coloured fluid escape through the catheter it must be urine, as the deep aniline colour of the fluid in the bladder renders deception from that source impossible. When the catheter is introduced as far as the bladder, touch and sight assist in its further introduction into the ureter.

'By turning its point forward and elevating the handle, a slight prominence is produced on the anterior vaginal wall. Throughout the manipulations of the catheter this is the constant guide to the vesical orifice of the ureter. The first step after the introduction of the catheter into the bladder is to try to locate the ureteral eminence by the sense of touch communicated from the tip of the catheter.

'To this end the movements of the point on the anterior vaginal wall are closely watched as it plays over the base of the bladder. It is made to gently

glide in a fore and aft direction from the neck of the bladder to the cervix, in the median line, a little to one side, a little further out, and so on until it reaches the ureteral eminence, when it is distinctly felt to trip, jogging the thumb and finger in which the catheter is held.

'The same movement is repeated until this point is exactly located. The attempt is now made to introduce the catheter into the ureter by carrying the handle to the opposite side, thus directing the point toward the posterior lateral wall of the pelvis, when the catheter is withdrawn slightly, and with its point still down, but turned a little more toward the side, is swept downward, outward, and backward in the direction of the ureteral prominence. With each of these sweeping motions the catheter is rotated until the point is directed fully outward or slightly upward.

'This movement, employed in engaging the catheter in the ureter, may very appropriately be called *fishing* for the ureter.

'As soon as the catheter enters the ureter its course is fixed, and the tactile sense at once recognizes that it no longer lies free in the bladder as before. If the catheter be released for a moment the handle does not drop, but remains in a fixed position and forms an angle, of about 30°, with a line projected from the urethra. The catheter should be carried into the ureter until its point reaches the wall of the pelvis, when the plug is removed from the end. Another may now be introduced into the opposite ureter, and both be thus catheterized at the same sitting.

'On account of the partial occlusion of the urethra by the first catheter, the second is slightly more difficult to introduce.

'If it be desirable to carry the catheter higher, even over the brim of the pelvis and up to the pelvis of the kidney, the bladder can be emptied by introducing a small glass catheter under the two ureteral catheters. The contracted bladder now forms a movable organ, which can be displaced upward without harm in manipulating the ureteral catheters.

'With an index-finger introduced into the rectum, the catheter is lifted up and guided while it is pushed on up over the pelvic brim and up to the pelvis of the kidney.

'As soon as the plug of each catheter is withdrawn, an assistant notes the time, so as to be able to tell afterwards just how long the urine has been flowing from each kidney. The minim graduates are held below the catheters to catch the urine. An average of 1500 c.c., or about three pints, is the normal daily excretion of urine. If from both catheters one cubic centimetre a minute, or half a cubic centimetre from one catheter, is passed, the number of minutes in a day multiplied by this amount gives 1440 c.c., which is practically the normal excretion. I have frequently found just this proportion upon estimating the day's urine by the amount collected in a few minutes by the catheters.

'Oftener the amount falls much below normal. In disease there is frequently a marked difference in the amount of urine collected from the two sides. One side may flow freely and the other discharge no urine, although this may be due to stricture, which I have demonstrated by pushing the catheter up beyond the stricture and over the brim of the pelvis, when immediately several ounces escaped. One side may be alkaline and the other

acid; one may be bloody or pure blood and the other clear urine; one may be pus and the other urine.

'The urine evidently flows from the kidney in little wavelets. It does not appear at the end of the catheter for from one to eight or ten minutes, and then it only escapes by drops at intervals of a few seconds to a minute or more.

'Fifteen minutes is an average time for the duration of the catheterization. The urine of each side is then marked and set aside for examination. The catheters are plugged and withdrawn, and the urine in each of them is added to that in the graduate from the same side. A little patience and tact, as I have said, are all that is needed to succeed in this little manœuvre, which adds so much to the possibilities of gynæcology, as it brings into this special branch of surgery renal diseases in the female.

'A valuable aid for the beginner searching for the ureteral orifice is as follows: A point is marked on the cystoscope, 5½ centimetres from the vesical end, and from the point two diverging lines are drawn towards the handle, with an angle of 60° between them. The speculum is introduced up to the point of the V, and turned to right or left until one side of the V is in line with the axis of the body; then by elevating the endoscope until it touches the floor of the bladder the ureteral orifice will usually be found within the area covered by the orifice of the speculum. The ureteral orifice can often be found by an adept at once, and almost instinctively, by a single movement of the speculum after its introduction into the bladder.

'In order to ascertain whether it be the ureter which lies within the field, I use as a searcher (Fig. 587), a long delicate sound with a handle bent at an angle of 120°, which is introduced through the speculum into the suspected ureteral orifice, and the lateral walls of it are slightly raised, appearing as distinct folds with a dark pit between them. The searcher may be withdrawn and a ureteral catheter at once introduced, if it is desirable to collect the urine direct from the kidney. The ureteral catheters which I use for direct catheterization are quite different from those heretofore employed. They are straighter, and either have no handle or only a small one which will readily pass through the No. 10 speculum.'

Kelly recommends the following method for obtaining a small quantity of urine from the ureter without catheterization. The speculum is pushed close under the orifice of the ureter in the bladder, the drop of urine is caught by the speculum, and runs down its side to the outer lip, where it is taken on a slide for microscopical examination. He has also devised a urine collector. The instrument is shown in the drawing.* It is used with the speculum, and may be carried through it with the patient lying on her back. As this method of exploration is also applicable to the passage of a bougie into the ureter before an operation for hysterectomy, I give his description in his own words:—'The patient lies on her back on

* Fig. 593.

a flat table, with thighs well drawn up on the body, and the bladder is emptied. The No. 9 or 10 cystoscope is now introduced, and its outer end strongly elevated, the inner being turned toward

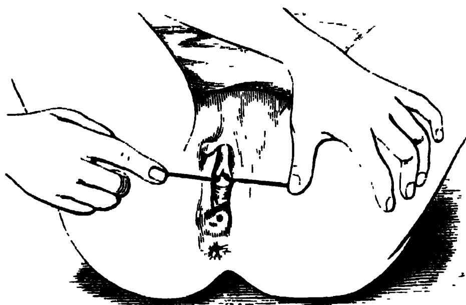


FIG. 595.—HARD-RUBBER BOUGIES INTRODUCED INTO BOTH URETERS PREVIOUS TO HYSTERECTOMY FOR CARCINOMA.

the right or left side of the base of the bladder.' The speculum is now withdrawn as far as the urethral orifice to locate its position, and then pushed in again and turned to one side with the idea of bringing the urethral orifice at once within the lumen of the



FIG. 596.—STRICTURE OF RIGHT URETER DEMONSTRATED BY CATHETERIZATION. Catheter passed up above stricture, followed by a rapid, continuous flow of urine, while urine escaped by drops in much less quantity from opposite side. Difference in quantity of urine obtained in the same time from both ureters shown in conical glasses.

speculum. If there be difficulty in seeing the urethral orifice, the speculum is pressed against the bladder wall, and then, after drying out the few drops of urine in it, the orifice is found by gliding the

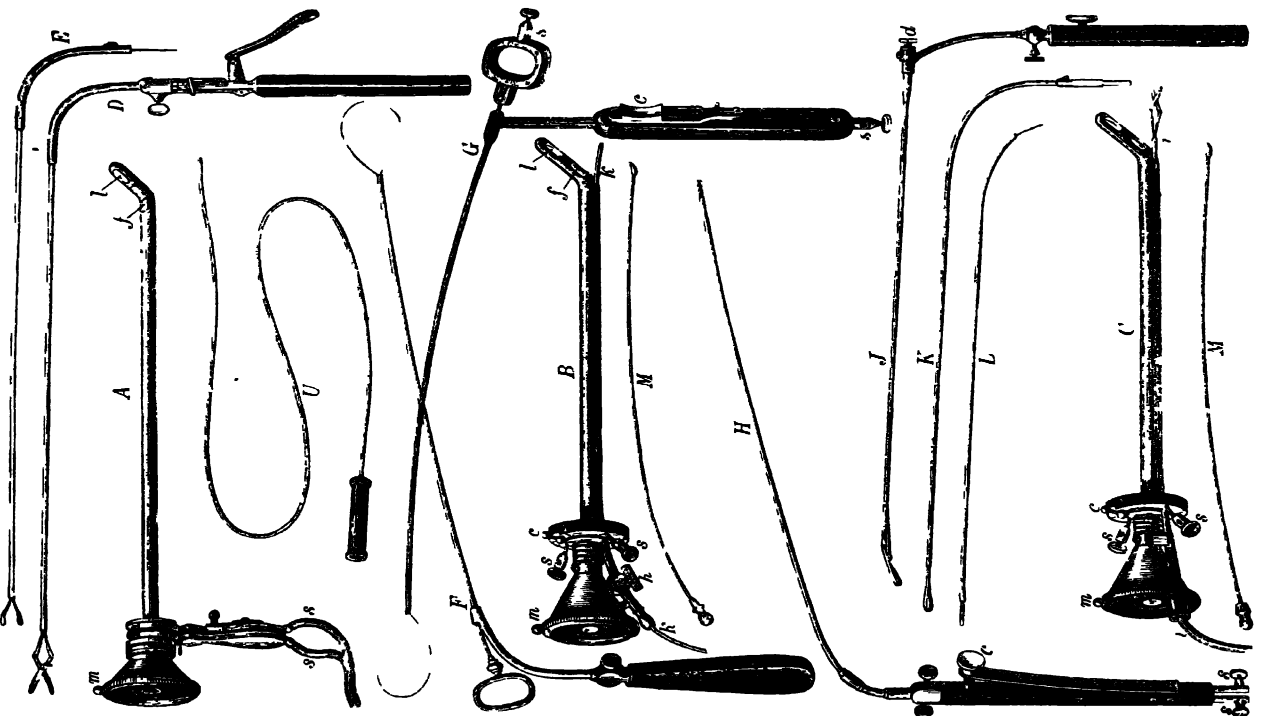


FIG. 597.—KOLISCHER'S DIAGNOSTIC (*A*) AND OPERATIVE CYSTOSCOPI (*B* AND *C*). Showing the various lever forceps (*E*), scissors (*D*), sounds, knives, galvano-caustic (*G*), and cold snares (*F*), curettes (*J K*), and the ureteral catheter (*U*), which are passed through the cystoscope for operative procedures in the bladder (Leiter—*Vienna*; Schall—*London*.)

instrument over the vesical mucosa, and the ureteral searcher is used to discover it. When found, a catheter is pushed into the ureter, and thus the surgeon can easily feel the tube during operation.

Winter, of Berlin, and Kolischer, of Vienna, were prominent workers in the field of cystoscopy. The latter surgeon has brought his instrument to a great state of perfection, and by its means can be diagnosed, without any anæsthetic, affections of the vesical mucosa, various growths, or small calculi. By its aid also the ureter can be directly explored and catheterized. Therapeutic agents can be applied through it to the bladder wall without difficulty. I can speak from personal experience of the facility with which these various manipulations can be carried out by means of Kolischer's appliance.

CHAPTER XLII.

AFFECTIONS OF THE BLADDER AND URETERS—(continued).

Of the affections of the female bladder to which a special reference must be made, are—

Congenital Defects.	Calculus.
Displacement.	Neoplasms.
Hyperæmia.	Tubercle.
Cystitis.	Foreign Bodies.
Fistula.	

Cases have been recorded of the *congenital defect* known as double bladder. Cattier in the seventeenth, and Gerard Blasius in the eighteenth century, met with cases of this anomalous condition, but these, with those reported by Allan Smith of Baltimore, and Fath of Metz, in 1878 and 1894, occurred in the male sex. Howard Kelly says that he found two cases of loculate bladder, that is, a bladder with diverticular or pockets, mistaken for supernumerary bladders by earlier observers.*

Congenital exstrophy of the bladder is rarely met with in the female sex. In this condition there is a defect of fusion in the abdominal laminæ, and in consequence there is an opening in the abdominal wall, with a fissure in the anterior wall of the bladder, or a still larger defect in it which is sometimes associated with a cleft in, or absence of, the symphysis pubis. Such exstrophy has as its consequence a protrusion of the mucous membrane, which has more or less of a fleshy granulating or indurated appearance. It may be associated with other congenital defects in the genital organs.

A transplantation operation is here indicated, the number, size, and shape of the skin flaps depending upon the size and character of the opening.†

* Howard Kelly, 'Operative Gynæcology,' vol. i. p. 317.

† A case was sent me by the late Martin Brown, of Exeter. A young woman,

Alterations from the normal position of the bladder, with encroachment upon its walls, and consequent distension, or its partial displacement, are generally due to effusions into the pelvic cavity, tumours of the uterus, or prolapse.*

Hyperæmia of the Trigone.—Irritation of the neck of the bladder, in the region of the ureters, is a commonly recognized condition. A scalding sensation in passing water, frequency in micturition, with pain, are the prominent symptoms. In the case of a patient on whom I operated some years since for carcinoma of the cervix, I found that any application of carbolic acid in the weakest solution in the vagina, or even an examination with carbolized vaseline on the finger, immediately produced intense vesical irritation. Excessive acidity of the urine, errors of diet, cold contracted from chill, after operations for hæmorrhoids, the passage of a catheter, or rudeness in coitus, are some of the most frequent sources of this vesical irritation. The urethra is intensely sensitive to the catheter, and its orifice is sometimes found red and slightly swollen. Howard Kelly has examined by his method patients suffering from this condition, and has found the entire bladder sound with the exception of the trigone area. The hyperæmia here may pass on into ulceration and isolated ulcers, giving rise to hæmorrhage. He recommends the application directly through the endoscope of a three-per-cent. solution of nitrate of silver on a piece of cotton.

aged 21, had never retained her urine. The urethra (practically the neck of the bladder) was very large, admitting the forefinger, and was about one inch in length. The ureters opened immediately into it. The bladder was contracted to the size of a few inches in either diameter. Its mucous coat was quite smooth. The large urethral orifice was placed high up at the summit of the vulva, which was abnormal in the position of both its larger and smaller lips. The vaginal canal otherwise was normal. The girl, who was very good-looking, had an offer of marriage. An endeavour was made to create a urethral orifice by transplanting the labia and nymphæ towards the mesian line, and thus to elongate the urethral canal. There was a partial success, but it was not permanent, though the cosmetic effect was all that could be desired. The urine secreted from the kidney immediately crusted on the self-retained catheter, and commonly dried in powder on the clothes. I had some collected and analyzed. It was resolved into calcium phosphate, sodio-ammonium phosphate, and ammonio-magnesium phosphate—practically, earthy and alkaline phosphates. It was surcharged with ammonium carbonate, probably produced by the decomposition of urea. It also contained an amylotic ferment and traces of pepton, phenol, and biliary excreta. A portion of an elastic catheter macerated in some of this urine for three days was bleached, a white deposit (phosphatic) of earthy salts being deposited upon the submerged surfaces. At the same time a small quantity of sulphur was dissolved by the fluid.

* See chapters on Pyo-salpinx and Prolapse of the Uterus and Vagina.

Rest, demulcent drinks, and the internal remedies I have recommended in cystitis, generally afford speedy relief.

The gentle washing out of the bladder with a soft catheter, with warm, weak, alkaline solution is most soothing.

Matthew Mann, of Buffalo, has rightly insisted on the reflex ovarian pains, the occurrence of ureteritis as well as the irritation of the bladder, that may follow upon simple acidity and condensation of the urine. At the same time, it is right to observe that the error the surgeon is most likely to fall into, is not neglect of examination of the urine for any bladder trouble, but, as has been already pointed out, the omission of seeking for an explanation in some outside source, such as a uterine displacement, a tumour, or possibly hæmorrhoids.

CYSTITIS—*Causation.—This is an affection which the gynæcologist has constantly to deal with, whether as the consequence of gonorrhœa, exposure to cold, pelvic inflammatory conditions, or following traumatic causes, either operative or as the result of direct violence.**

The principal causes of cystitis are:—

Presence of septic organisms.
Exposure to cold.
Parturition.
Habitual neglect of the bladder.
Uterine displacements.
Morbid state of the urine.
Gout.
Urethritis.
Gonorrhœa.
Calculus.
Tumours.
Unclean catheters or bougies.
Excessive coitus.
Parametritis.
Operations.
Injuries.

Cystitis has been divided into three distinct forms according as the entire mucosa is attacked or the inflammation scattered in patches or circumscribed to one area—*diffusa, circumscripta, dispersa.*

Septic Organisms.—In the etiology of cystitis the part played by organisms is important, some special bacteria, having been described by different authorities as present in a large proportion of cases—*Bacterie septique de la vessie* (Clado), *bacterie pyogene* (Hallé), as well as the staphylococci, the streptococcus, and diplococcus. Melchoir found the colon bacillus present in a large number of cases, regarding these as morphologically the same as the organisms found by Clado and Hallé. Kelly gives (*lib. cit.*) the pathogenic bacteria which have been most commonly isolated in inflammation of the bladder as follows: B. coli communis, streptococcus pyogenes, staphylococcus

* See p. 834.

pyogenes albus, citreus, andaureus, B. lactis aerogenes, bacillus liquifaciens, the gonococcus, typhoid bacillus, tubercle bacillus, and several forms of proteus.

While such organisms may be found in cystitis, it has also been proved that they may exist in the bladder without causing inflammation, though some of them are necessary attendants upon it, requiring, however, some exciting cause to start the inflammation. From this we can readily understand how suppurative conditions of the pelvic viscera, discharges from the vulva, suppurative states of the kidney, and direct introduction into the bladder by instrumentation, may set up cystitis.

In all cases in which there is doubt as to its cause, a careful bacteriological examination should be made, especially in young patients, for the presence of tubercle bacilli.

Symptoms.—The symptoms are: increased frequency in passing water, irritability at the neck of the bladder, with pain during, and immediately after, the act of micturition. If the affection be chronic, in addition to the frequency of passing urine and the pain present in the acute affection, the patient's health becomes generally impaired, and there is pain in the perinæum and down the thighs or in the supra-pubic region. Pain is also experienced on a vaginal examination if the bladder be pressed on by the finger.

The urine is generally alkaline and phosphatic; it contains a quantity of mucus, decomposes rapidly, and has a very offensive odour. Gradually the bladder becomes contracted, and a smaller quantity is retained. Later on, when the ureters and kidney are inflamed, uræmic symptoms may be present, and pus as well as mucus is detected in the urine.

Changes in the Bladder.—If the affection be not cured, after a time congestion and epithelial desquamation are followed by thickening and rugosity of the mucous membrane, with general thickening of the muscular and connective tissue. The orifices of the ureters are encroached on, the tubes become dilated and are generally thickened. The disease travels slowly but surely backwards; the kidneys finally yield to the pressure and distension, and they in their turn become disorganized. Ulceration and pus accumulation occur both in the bladder and ureters.

Course and Termination.—An acute attack of cystitis, due to cold or traumatic cause, if properly attended to, with rest and suitable medication, is generally amenable to treatment. Not so the chronic form. The prognosis is most unfavourable, chronic catarrhal cystitis being a most intractable affection, pursuing the course above indicated with all the attendant symptoms.

Treatment.—In acute cystitis the treatment will consist of: Rest in bed, and warmth; demulcent drinks; milk diet; linseed tea, flavoured with clove. Lithia, Salvator, Ems (sodium-lithium spring), Contrexéville, soda, or potash waters may be given as drinks.

As medicines—

Decoction of pareira.
Infusions of buchu.
" " uva ursi.
" " scoparium.

These must be given in one-ounce doses, in combination with the tinctures of hyoscyamus, buchu, or uva ursi, with liquor potassæ, or potassium bicarbonate and ext. hamamelis liq. Large draughts of decoction of triticum repens are sometimes soothing.

A warm bath will occasionally relieve pain, and a morphia suppository may be placed in the rectum.

An admirable mixture I find is:

℞. Liq. potassæ, ʒiss.
Tinct. uvæ ursi, } āā ℥ss.
Tinct. buchu, }
Tinct. hyoscyami, ʒii.
Liq. hydrang. lith., ʒi.
Elixir saccharin, min. xxx.
Inf. scoparii, } āā ℥iv.
Decoct. pareiræ, }
ʒi. three times in the day. M.

Either uva ursi or buchu may be substituted for the broom infusion. Lithiated hydrangea given in ʒi. doses in combination with hamamelis will be found very useful.

The bowels must be regulated if necessary by an emollient enema, and such saline aperient waters as Æsculap, Rubinat, or Hunyadi Janos, may be given.

The oil of copaiba or cubebs or santal, in small doses, may be tried suspended in the mistura amygdalæ comp. or the palatinoids of the oils of copaiba or santal, especially in those cases of a specific nature. In the latter stages the benzoate of ammonia in fifteen to thirty grain doses is a useful remedy. Vegetable diuretic infusions may then be discontinued, and the mineral acids commenced. Matico in infusion and tincture I have found useful combined with hamamelis. Contrexéville is the water I have most frequently given in vesical irritation with benefit. The bladder should in all obstinate cases be washed out at least twice daily with some extremely weak

antiseptic lotion, such as boric acid, carbolic acid, salicylic acid (a few grains to the ounce), or corrosive sublimate (1 in 100,000 gradually increasing to 1 in 10,000). This may be done with a double catheter and syphon-tube. Hæmorrhoidal conditions require attention. Uterine displacements should be rectified.

Emmet's Operation. — If general and local treatment fail, Emmet's operation of cystotomy, to give the bladder rest through the creation of a vesico-vaginal fistula, may be performed. He advocates this step strongly, going so far as to say that 'our means for curing cystitis are limited to a single procedure, that of vaginal cystotomy, and all other means yet known to us are but adjuvants.'

The operation consists in the following steps :—

1. Placing the woman as described in the button-hole operation on the urethra.

2. Introducing a curved sound or a fenestrated staff of Harris into the bladder.

3. Seizing the projected vaginal tissue with a tenaculum in the middle line, which is then divided with a pair of scissors so that the sound may be passed into the vagina. The vesico-vaginal septum is then divided in the median line.

4. Uniting the vaginal and vesical edges by sutures, as before described.

Pallen used a Paquelin's cautery to open the bladder. Emmet disapproves of this method, inasmuch as there is risk in some cases of injuring the bladder or ureters. Afterwards the bladder is freely washed out through the opening with warm water. In due time, if the cure be complete, the fistula is closed.

Kelly's Balloon Treatment of Chronic Cystitis.—Kelly recommends, as the most efficient way of treating chronic cystitis, to place the patient in the same position as that adopted for cystoscopy, and to expose the affected spots, which are then carefully touched with a solution of nitrate of silver on a cotton pledget of from 3 to 5 per cent. Clark uses a vesical balloon. It is made of rubber, which can be rolled round and grasped in a urethral forceps, so that it can be carried through the urethra into the bladder. The parts having been thoroughly disinfected, the bladder is emptied, and the patient placed in the knee-breast position. The urethra is thoroughly cocainized, and a vesical speculum is next introduced. The balloon is now, with sterilized hands, taken from the boric acid solution in which it has been placed after boiling. Sterilized gelatine, of the consistence of cold olive oil, is poured on the balloon as it is rolled round with the finger and thumb, so as to shape it into the form of a suppository. In this shape it is introduced into the bladder by the forceps, and is gradually distended by means of a syringe pump. There is generally pain of a more or less severe character both during and for some time after the application, which may be alleviated by a rectal suppository of opium. The air is prevented from escaping from the balloon by a clip which is placed on its rubber tube. It is left in position

for from 15 to 20 minutes. The clip is then removed, the balloon aspirated completely, and withdrawn from the bladder. The gelatine may contain 10 per cent. of ichthyol. The treatment is continued, at first every day, and afterwards every second or third day.

Gonorrhœal Cystitis.—The management of a case of gonorrhœal cystitis must be conducted on the same lines as those laid down when dealing with gonorrhœal vaginitis. While treating the inflammation on general principles, and in the manner just described, gentle irrigation of the bladder with 1·80,000 to 1·100,000 of perchloride of mercury, alternated with weak boric acid, quinine, and alkaline solutions, the oils of santal, cubebs, and copaiba, being specially indicated.

Post-operative and Puerperal Cystitis.—Neglect in the proper sterilization of catheters, and the rough use of them by nurses, are the most frequent sources of cystitis after various operations, and after parturition. Women are particularly liable to irritation, congestion, and inflammation of the bladder after the operation for hæmorrhoids, therefore particular attention has to be paid to the bladder, and great gentleness used in relieving it should this be necessary for any time subsequent to the removal of the piles. In many cases there is first an attack of urethritis, and the trouble lasts for some days, and is limited to the urethra, before it extends to the bladder, and the early adoption of soothing treatment, with the careful withdrawal of the urine, will prevent the onset of the graver mischief.

Cystitis due to Uterine Causes.—While displacements, tumours, and peri-uterine effusions are the most frequent sources of vesical irritation in women, they do not often cause actual inflammation unless there be some uterine source of infection in the shape of discharge, or a communication of a fistulous nature between the bladder and the uterus, or the adnexa.

Tubercular Cystitis.—It is clear that the bladder may be infected by tubercle, either from the kidney above or the urethra below. Of great importance to the gynæcologist, is the fact that tuberculous disease may find its way through the involvement of ureter or bladder from a suppurating pelvic abscess, or pyo-salpinx. Some of these cases are most difficult to diagnose, and demand careful examination of the kidney, ureter, and bladder, as well as the pelvic cavity; also, if we suspect tubercle, the lungs. The difficulty in diagnosis is in the earlier stages of the disease, before ulceration has occurred, and the urine become purulent. There may be a

tuberculous history in the family. Diagnosis is completed by the discovery of the characteristic organism, which may be found either in the urine or by removal through the cystoscope of a small portion of the affected mucous membrane, either by the curette, or lever forceps.

The treatment of tubercular cystisis, and tuberculous ulcer of the bladder, must be conducted on the same lines on which we proceed to treat the disease when occurring elsewhere. Apart from the general treatment of the case, hygienic and therapeutic, local remedies have to be applied. Once the local condition has been determined, the cystoscope will have to be employed for the purpose of topical application. By means of it an ulcer may be curetted, or an application of nitrate of silver can be made to an ulcer. The operation of curettage of the bladder may be performed either for obstinate, chronic, or tubercular cystitis. The bladder having been rendered as aseptic as possible by repeated antiseptic washings, the finger is introduced into the vagina and the curette into the bladder. The finger thus acts as a point of counter-pressure, regulating the force with which the curette is used. Successively various portions of the bladder are carefully gone over with the curette, or, if only there be a locally affected area, this is dealt with.

The operation of cystotomy as a *dernier ressort* consists in the supra-pubic incision of the bladder, the suturing of the edges of the bladder wall temporarily to the skin, the exposure of the diseased surface, and the excision of the affected mucosa. The closure of the bladder wound is effected by catgut sutures, and is followed by that of the abdominal incision in the usual manner. No drainage-tube is used (see p. 837).

Stone in the Bladder.—The symptoms of the stone are:

Frequency in passing water.
Pain principally felt after passing.
Presence of blood in the urine.
Presence of phosphates and mucus.

The stone is felt by the sound or finger, and is seen by the cystoscope.

Foreign bodies form the nuclei of calculi. Howard Kelly records this interesting case.

The hairpin was introduced by the patient, a young unmarried woman, who married a short time afterward. She passed through a confinement without any injury to the bladder, although the calculus had already formed

about the pin, and was felt by the doctor in attendance, who pushed it up into the abdomen while the head was descending through the pelvis. No explanation could be obtained from the patient as to how the hairpin got into the bladder, but the mother, who saw it after removal, declared that she must have swallowed it.

Tenison Collins removed the specimen (Fig. 599), having accidentally discovered it in the bladder when operating for stenosis of the uterine canal for dysmenorrhœa. The patient had introduced it two and a half years previously.

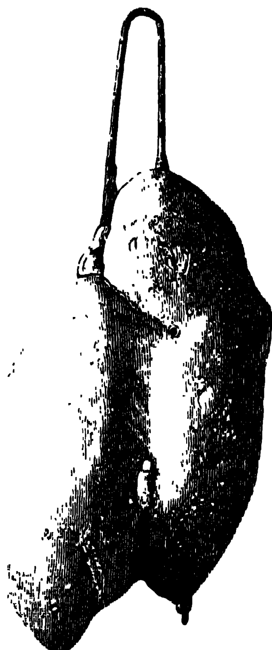


Fig. 598.—Hairpin Calculus. (Howard Kelly.)



Fig. 599. — Metal Penholder (three inches long). Removed from the bladder of a patient, aged 25, by vaginal cystotomy.

Litholapaxy (Lithotrity at one sitting).—To Otis, of New York, we owe the teaching which has established the possibility of introducing large instruments into the bladder. To Bigelow we are indebted for the modern operation of crushing stone in the bladder, and removing the fragments at one sitting by aspiration. The operation is performed thus: The presence and size of the stone having been determined, the patient is placed under ether in the

lithotomy position. If no urine be in the bladder, a few ounces of warm water are injected. The lithotrite is introduced, and the stone is crushed. (The student is familiar with the more minute description of this step, and the details of the operation of lithotrity in the case of stone in the male bladder.) The large evacuating catheter is now introduced, and if the urine is in the bladder it is withdrawn. The modern improved aspirator is then attached to the catheter, and about three ounces of warm water is injected into the bladder. With the outflow the fragments are received into the glass bulb attached to the aspirating bag. Larger fragments which remain are crushed and removed in the same manner. Other details of the operation, as, for instance, the method of seizing and crushing the stone, the removal of all the débris, the freeing of large particles, are the same as in lithotrity on the male. The woman may be given a warm hip-bath and an opiate some hours after the operation, if there be pain. Alkaline drinks are indicated, and any symptoms of cystitis attended to.

P. J. Freyer, who ranks amongst the most expert of lithotritists, remarks that of a series of litholapaxy operations, all turning out successful, there were thirteen cases of stone in females. One woman, from whom he removed a stone over an ounce in weight, was seven months pregnant, and made an excellent recovery. The only special difficulty met with in this operation in the female is in retaining water in the bladder during its performance. Owing to the shortness and width of the urethra, the water rushes out beside the instruments. This may be obviated by an assistant placing the fore and middle fingers of one hand in the vagina and pressing the posterior lip of the urethra against the lithotrite or cannula.

Vaginal Cystotomy.

If either from the size of the stone, the state of the bladder, or the condition of the health of the woman, the operator should wish to perform lithotomy, an opening is made of sufficient size in the vaginal septum, and the stone is extracted. The bladder is subsequently washed out by the urethra, and the vaginal wound treated as a vesico-vaginal fistula.

Removal of Small Calculi by the Fingers.—Croom recommends that the fingers be used (Fig. 600) for pushing small calculi from the bladder into the urethra, and through it from the meatus. If the urethra be dilated, this proceeding is facilitated. This plan is limited to stones no larger than the finger-tip.

Treatment of Incontinence by Forcible Dilatation of the Bladder (H. Marion Sims).—H. Marion Sims, for incontinence of urine in young girls, practises forcible dilatation of the bladder. In all the patients he has found the bladder so contracted that it held but a few ounces, or less; in one case, that of a girl of thirteen years of age, it only held three-quarters of an ounce. The plan adopted is the daily injection of comfortably warm water into the bladder to the point of distension, increasing the quantity by half an ounce to an ounce each day until the retaining power of the bladder is improved; then it is practised every second day, and, finally, once in the week. He has succeeded in getting these patients to retain twelve and eighteen ounces comfortably. In some cases he combined the use of a mild Faradic current applied to the neck of the bladder with the dilatation.

Alexander's Recto-Vesical Operation for Incontinence from Fistula.—William Alexander brought before the Gynæcological Society, April 25, 1888, 'a method of treating incontinence of urine in the female in cases hitherto considered to be beyond the resources of surgery.' The principle of this method consists in conveying the urine into the rectum, and converting the anus into the permanent channel for its escape. The anal sphincters are thoroughly dilated; the base of the bladder is pushed into the rectum with the finger, on which the rectal wall is divided, so as to form a communication between the bladder and rectum, into which one end of a vulcanite stud is inserted, so that the flat head of the stud is in the bladder and the screw-end protrudes into the rectum; on this the other end of the stud is screwed, and a permanent opening is thus secured between the bladder and rectum. The next step in the operation consists of complete closure of the vulvar orifice by separating the labia minora from the labia majora all round, and turning the epithelial surface of the former towards the bladder, suturing these, and, finally, completely closing the latter. This operation has given rise to a good deal of criticism; but it must be remembered that the condition for which it is proposed is a desperate one, and if by it we can better succeed in closing completely the vulvar orifice, and the diversion of the urinary stream does not make the woman's condition worse through rectal irritation, this ingenious device of Alexander's is worth a trial.

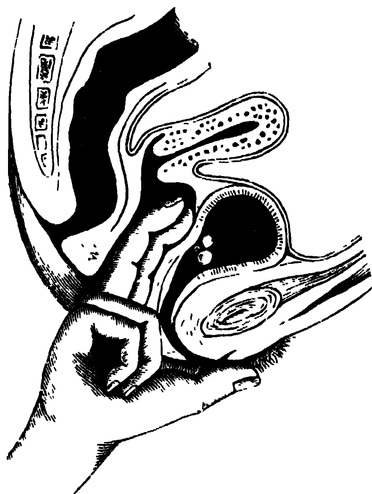


FIG. 600.—CROOM'S PROCEDURE.

Tumours and Growths.—Carcinoma, papilloma, sarcoma, and fibroma are found in the bladder. Polypi occur rarely, save in the case of children.

Benign and Malignant Tumours.

I have already classified the tumours found in the bladder. Probably villous growths are those which we most frequently meet with, but there is a special difficulty in the differentiation, both pathologically and clinically, between benign and malignant tumours of the bladder. Also, the early diagnosis of tumour of the bladder is a matter, in many cases, of extreme difficulty, inasmuch as the earlier symptoms of frequency of micturition, or difficulty in passing the urine, amounting to retention and pain, are present in ordinary cystitis. Küster classifies * tumours of the bladder according as they arise from the connective, the muscular, or the glandular, tissues. As regards the situation in which neoplasms are more frequently found, the neighbourhood of the base of the bladder is most often their seat. Tumours, again, are pedunculated, and these are either single or multiple. Pedunculated tumours are of the myxomatous type, are generally found near the neck of the bladder, and occur during early life.

Diagnosis.—When the presence of a tumour of the bladder is suspected, the first step to take is to have an exhaustive examination made of the urine, chemical and microscopical. Any shreds of tissue which pass are submitted to the microscope. Palpation of the bladder through the vagina, and bi-manually, is made, and the size, direction, and relations of the growth are determined. Such steps, however, are only preliminary to cystoscopy, carried out in one of the ways that has been described.

Symptomatology.

The symptoms of bladder growths are often obscure. The most characteristic symptom of malignant disease is hæmorrhage. Hæmaturia may not, however, take place for a considerable time after the earlier symptoms of frequency in passing water, and slight supra-pubic pain, have been complained of. The hæmorrhage often is periodical. An interval of time elapses, and then the bleeding continues for a short time and again ceases. In other instances it is persistent and alarming. In any case of hæmaturia, the first point to decide is the source of the blood, and next, having localized this in the bladder, to determine by cystoscopy if the cause be a

* Volm. Sammlung Klin. Vort.

tumour, and, if so, the size, and if possible the nature, of the growth.

It is impossible to over-estimate the importance of hæmaturia as a diagnostic sign, and as an indication for cautious examination, not only of the bladder, but of the ureters and kidneys. This will demand vaginal, as well as vesical, and possibly rectal, exploration, with careful palpation of the kidneys. To show the importance of this step, I may cite the following case :—

Mixed Cell Sarcoma of the Bladder.

The patient had suffered for some time from symptoms of cystitis, and for the last three months from severe hæmaturia. She had been treated on the Continent for cystitis. After her return home, the growth was first discovered *per vaginam.* It was located in the immediate neighbourhood of the neck of the bladder, and occupied the base and posterior wall of the viscus. Particles brought away after exploring and washing out the bladder did not, on microscopical examination, throw light on the exact nature of the growth. It was determined to dilate the urethra and remove it. This was done satisfactorily, and no bleeding occurred subsequent to the operation. Unfortunately, septic symptoms set in, followed by suppression of urine, death occurring on the sixth day after operation.

Pathological Report on the Growth by Mr. J. H. Targett.

'This tumour may fairly be described as a mixed-cell sarcoma, the round and oval shapes predominating, and the short spindles being in less abundance. It is very vascular, and the vessels are mostly of the thin-walled type characteristic of sarcomata. The surface of the tumour is covered with granular matter, due to ulceration and sloughing of the sarcomatous tissue. In consequence, there are evidences of diffused inflammation in the growth immediately subjacent to the necrotic layer, and these inflammatory changes complicate the structure of the tumour throughout the microscopic section. Several giant-cells are to be seen in every section, but they are not numerous enough to call the growth "myeloid." Such giant-cells are not uncommon in rapidly growing sarcomata. To the naked eye the specimen had a nodular or bossy outline, but did not appear to be covered with mucous membrane, as is usual when sarcomata bulge into the cavity of the bladder.' (See Fig. 601.)

Supra-pubic Cystotomy.

In supra-pubic lithotomy the bladder is reached by a clean incision in the usual manner. All bleeding is arrested, the prevesical fat is carefully divided, and the peritoneum is pushed

* *Brit. Gyn. Jour.*, Feb., 1897.

upwards with the finger. The bladder is then transfixed transversely with a hook, and is next opened in the median line, the incision being carried downwards towards the symphysis.

The margins of the vesical wound are now caught at either side with catch forceps, and held apart. Should there be difficulty in retaining the edges of the bladder, and preventing it from descending out of reach, a few sutures may temporarily be passed through it so as to fix it to the abdominal wall. The tumour is now exposed, and removed by dissection, écraseur, or curette forceps. In some cases portions of the bladder are resected with the growth, and after extirpation the wound is closed by catgut sutures, and the

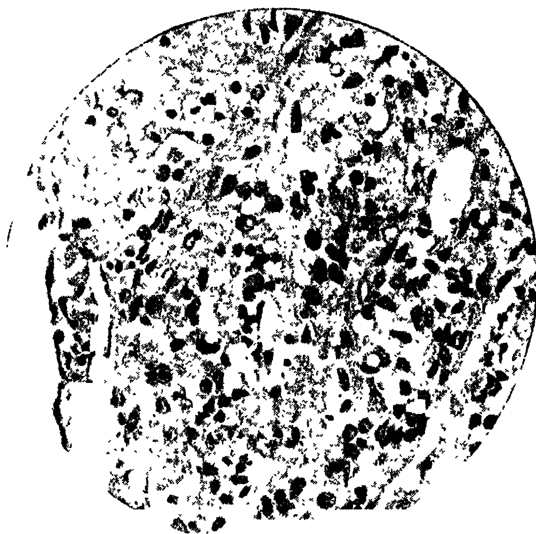


FIG. 601. MIXED CELL SARCOMA OF THE BLADDER.
(Author—Section by Targett.)

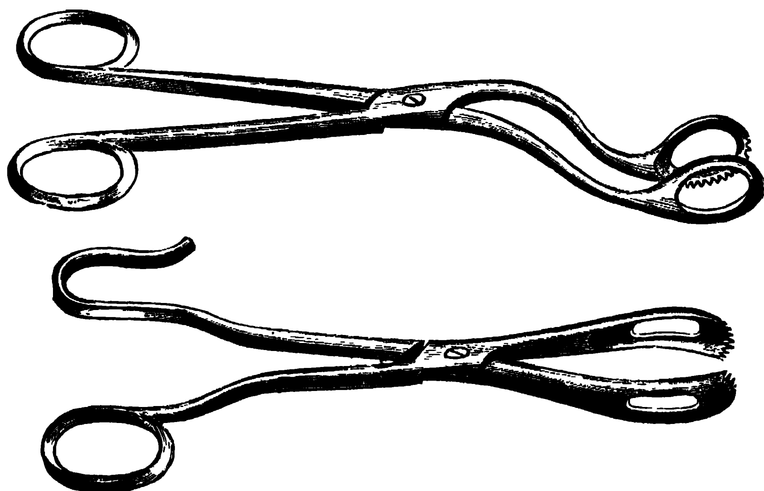
bladder is constantly drained. Should the ureter be cut or wounded in extirpation, a transplantation operation has to be performed. The closure of the bladder mucosa, or its entire wall, demands considerable care and nicety. After it is done the abdominal wall is closed in the usual manner.

In these operations an electric photophore or forehead mirror is most useful, but this may be dispensed with if the electric lamp, with reflector, be availed of.

Treatment.—The only treatment for vesical tumours is operation. In old age, Kelly says, and in childhood under five years, the growth

is almost certainly malignant and inoperative. The routes by means of which a tumour may be removed are the urethra, the vagina, and supra-pubically. Cystectomy was successfully carried out by Pawlik.* As in the case just quoted, if it be feasible, the urethra may be selected as the most favourable route for extirpation. After full dilatation of the urethra, the growth may be removed by the galvano-cautery snare, or knife. This applies more particularly to pedunculated tumours, or polypi.

Thompson's bladder forceps, with fenestrated blades, or the curved one with serrated edges, may be used in some cases to remove the growth piecemeal.



FIGS. 602, 603.—THOMPSON'S FORCEPS FOR REMOVAL OF THE TUMOURS FROM THE BLADDER.

Colpo-cystotomy.

In cases where we are in doubt of the feasibility of removal by the urethra, or when we may have to resect a portion of the bladder wall with the tumour, colpo-cystotomy is to be preferred. The growth is exposed through the vaginal incision, the edges of which are held apart, and the tumour extirpated. Kelly recommends transfixion of the latter at some distance from the field of operation, so as to hold it in place during the operation, thus avoiding the risk of hæmorrhage and delay from the open wound pulling back into the bladder.

* *Central. für Gyn. Beilage*, 1890, p. 113.

Affections of the Ureters.

In the chapters dealing with the anatomical facts bearing upon gynæcological practice, the surgical anatomy of the ureters has been discussed, as also the best method of examining them, both by inspection and palpation; and in the commencement of this chapter I have described fully the methods of catheterization of the tubes as first carried out by Howard Kelly, and the cystoscopic examination by the direct method or by the electric cystoscope of Nitze. The affections of the ureters that the gynæcologist has to deal with are—

Double ureter.
Ectopic ureteral orifice.
Ureteritis.
Hydro-ureteritis.
Pyo-ureteritis.
Calculus.
Stricture.
Ureteral fistula.
Ureteral prolapse.
Wounds.

The first of these congenital conditions does not materially affect the surgeon. The second, through the constant dribbling of urine from the vagina or some portion of the urethra, must attract attention, though the difficulty of rectifying the defect is great.

The first point to decide is whether the discharge of urine is from an abnormal ureteral orifice, or from some vaginal or urethral fistula.

This, independent of the history of the case, may be determined by careful searching of the distended vagina, so as to detect any small orifice, mopping the vaginal wall carefully with absorbent cotton-wool; and, further, by injecting the bladder with a coloured solution, either aniline or sterilized milk, and noticing that this does not affect the urine as it escapes. Kelly proposes to solve the questions (1) whether the opening is ureteral, and with which kidney it is connected; (2) whether it is a single or double ureter, and, if the latter, if there be a normal opening into the bladder; (3) if a double ureter, if it be so as far as the kidney, or if there be a fusion at some point above the bladder, and lastly, if the ureter be double, do the tubes open into separate pelves in the kidney, or into one pelvis common to both. If a long renal bougie can be

passed up the ureter for 30 centimetres, it may be palpated through the vagina and rectum, thus determining the side of the abnormal ureter.

By direct inspection of the bladder the ureteral orifices may be seen in normal position, and if they are so placed at both sides it demonstrates the fact that the abnormal ureteral orifice is the result of either a double or split ureter. (The mode of diagnosis may be readily understood by drawing a rough diagram of a kidney with a double ureter, one entering the bladder, and one continued on for some distance to enter the vaginal canal: by the side of this, another diagram of a kidney with a split ureter, the bifurcation taking place at a short distance below the kidney, and the ureters opening below as in the other case.)

The question as to whether the ureter is completely double, or split, and, if the latter, at what distance from the kidney, Kelly settles thus: He passes through the abnormal orifice a catheter sufficiently large to fill the ureter and as far as the pelvis of the kidney. He next passes through the normal opening of the bladder a second catheter. If it be a split ureter, this last will be arrested at the junction of the two tubes where the split occurs, and by comparing the distance relatively that both catheters have been passed, we may arrive at the position of the bifurcation. The procedure may be reversed, so as to verify the diagnosis.

The treatment resolves itself into transplantation of the ureter into the bladder, or, in the case of a double ureter with a single renal pelvis, by ligating the abnormal ureter at some point where it can be conveniently laid bare.*

Ureteritis.—The causes of ureteritis are, according to Mann, injuries during parturition, vesical disease, gonorrhœa, pyo-nephritis, abnormal urine, tuberculosis, and such pelvic affections as peri-uterine phlegmon, peritonitis, and tumours. Septic conditions of the bladder may infect the ureters. The pathological consequences of the ureteritis are seen in epithelial desquamation, ulceration, and purulent secretion. Such conditions bring about considerable thickening of the tube.

Symptomatology.—Frequency of micturition, and boring pain in the course of the ureters. Mann notices specially the mental depression attending on these cases.

Diagnosis.—The diagnosis of ureteritis by digital examination is by no means easy, and we owe especially to the original

* Kelly, 'Operative Gynæcology,' vol. i., p. 420.

American surgeon the more explicit instructions for examination of the ureter. The bladder and rectum having been emptied, the finger palpates the antero-lateral wall of the vagina, and if the ureter be enlarged or distended and inflamed, the sensitive tube, cord-like in the case of simple ureteritis, is found extending from the vaginal vault to beneath the base of the broad ligament, and is doubtless often mistaken for an inflamed and sensitive, or enlarged ovary in this position. Again, by rectal exploration, by laterally seeking for the sciatic notch, it may be found in proximity to the internal iliac artery. Only in rare cases, when the abdominal wall is very thin and relaxed, is it possible to feel the thickened ureter by abdominal palpation.

Tubercular Ureteritis.—If the ureteritis be of a *tubercular* character, we are more likely to have both pus and blood in the urine, as the bladder mucosa is generally affected as well as that of the ureter, but in all cases where tubercular infection is suspected, a bacteriological examination, in addition to a cystoscopic, will be necessary. From the experiments of Grunbaum it may be concluded that, in the majority of cases, the characteristic bacillus is not likely to be confused with the smegma bacillus of the external genitals, if careful catheterization of the bladder be made when securing the specimen to be examined; otherwise the organism is apt to be confounded with that of tubercle. Under any circumstances, however, the discovery of the tubercle bacillus in the urine is very uncertain, and it may escape detection, especially if we have not a sufficient sediment for examination. It must be remembered that in the majority of cases the kidney is primarily involved, and there are all the evidences of nephritis and pyonephritis present in addition to those which are due to the affected ureter.

Obstructed Ureter.—The ureters may be obstructed by tumours, both ovarian and uterine, peri-uterine effusions, malignant disease of the uterus and adnexa, broad ligament adhesions and contractions, iliac aneurisms, tumours in the bladder, and thickening of the bladder wall itself. It may be obstructed by a calculus, or a coagulum of blood or growths, specific or cancerous, which have their origin in the urethral walls. The ureter may also be obstructed as the consequence of gonorrhœal or other inflammation spreading to the tubes. Whether one or two ureters are likely to be involved in the obstruction, will depend in great measure on the cause; as, for instance, in malignant disease of the cervix uteri, both

are likely to be affected, whereas in such cases as smaller pelvic tumours, peri-uterine phlegmon, and tuberculosis, one only may be affected. Outside these causes there are those operative and post-operative ones due to ligature or wounds. The immediate consequence of such obstruction is either hydro-ureter or hydro-nephrosis. It is most difficult to locate ureteral pain, but if, in the presence of any of these causes of obstruction, there should be pain in the course of the duct, attended by frequent desire to pass water, the obstructive condition may be suspected. In a person of gouty habit, in which there has been pre-existing evidences of renal gout, verified by urinary analysis, there is the likelihood of a calculus blocking the lumen of the ureter, especially if the pain should come on suddenly and partake of the nature of renal colic. Such pain also, if it arise in association with pelvic suppuration, and the presence of pus in the urine, which varies in quantity, will lead to the suspicion that the ureter is involved in the pelvic inflammation. The possibility of the obstruction being due to stricture is not to be forgotten. The probability that this is the cause is increased if the presence of tubercle or gonorrhœa has been ascertained.

Stricture.—The diagnosis of stricture can only be made by the passing of the ureteral catheter in the manner already described, and Kelly has reported cases in which, by gradual dilatation with hollow bougies, a stricture has been overcome without operation. In this case, however, the treatment had to be prolonged for some months.* Such cases of stricture are rarely met with in women, save as the result of some pelvic operation.

Hydro-ureter.—Hydro-ureter, as the term implies, is a dilated condition of the tube due to obstruction, arising under one of the circumstances which I have indicated. Either from pressure from without, or blockage within the tube, it is frequently associated with distension of the renal pelvis or hydro-nephrosis. External pressure is most likely to affect the ureter as it crosses the pelvic brim, and consequently there is a general dilatation of the ureter as far as the kidney. The same state will follow from the impaction of a calculus near its vesical end. A large tumour, either in the pelvis or in the bladder, may cause double hydro-ureter with hydro-nephrosis of both kidneys (Fig. 448).

Pyo-ureter.—Pyo-ureter is the consequence of some infection reaching the ureter, in which there has probably been a previous

* Kelly, 'Operative Gynæcology,' vol. i., p. 438, *et seq.*

obstruction. Gonorrhœa, tuberculosis, pyo-nephrosis with renal calculus, cystitis, may result in hypertrophy and interstitial changes in the walls of the bladder.

Calculus.—Calculus is more frequently arrested in the upper portion of the tube near the pelvis of the kidney. The symptoms of stone in the ureter are often very obscure. If it be lodged in the ureter, symptoms such as those already indicated will probably be present; some elevation of temperature, with rapidity of pulse, intense pain, extending from the loin to the inguinal region, and at the same time frequent desire to pass water, in which blood is present. The method of palpation of the ureter has already been referred to, in treating of the anatomy of the tube. By this means, if the stone be low down in the neighbourhood of the bladder, it may be felt through the rectum or the vagina. A preliminary examination having been made to confirm the suspicion that attacks of ureteral colic arouse, the patient is placed in the position generally availed of in examination for renal calculus, and the lumbar region is carefully and bimanually palpated. Distension from hydro-nephrosis may be detected. Then, in the dorsal decubitus, it may be possible, by pressure in the course of the ureter, to detect a specially painful and circumscribed spot.

A stone may protrude through the ureteral orifice, or it may invest the ureter, and thus form a sort of sack, in the centre of which lies the calculus. Possibly this might be mistaken for a tumour.

Calculus in the ureter may, *if felt* by the finger, be removed through the rectum or the vagina, and possibly, if partly protruding, by the bladder. If in other situations, the operation of retro-peritoneal ureterotomy has to be performed, by which step the ureter is reached between the kidney and the true pelvis. After the removal of the stone by a longitudinal incision, the ureter is sutured.

In any case where the symptoms of calculus arise, examination by palpation should be made in the manner I have described (pp. 47–48 and 812–826).

Treatment.—During the passage of a calculus, or when it has first lodged in the ureter, the treatment must necessarily be palliative. Warm baths, constant fomentations, packs of laudanum over the loin and in the course of the ureter, hypodermic injections of morphia, warm drinks, periodical dosage of bromide combined with bicarbonate of potassium, with piperazaine, drinks of lithia and soda water, phenacetin in small doses, may be given. It is important to move

the bowel freely, and to keep the rectum empty. For this purpose calomel should be given, to be followed by a free saline aperient, or the rectum should be emptied by an enema.

FISTULA.

'The *diagnosis* of ureteral fistula,' says Kelly, 'will be made by noting: first, that, although there is a constant escape of urine, the patient still passes it at regular intervals; second, that upon injection of sterilized milk into the bladder, none of it escapes through the vagina, while the urine still escaping from the vagina



FIG. 601.—THE FIELD OF OPERATION THROUGH THE SUPERIOR STRAIT. The bladder is freed from its connections above and dislocated downwards, and on the right side backwards to meet the short ureter. Its superior surface is seen uncovered by peritoneum. The angle in the middle is the lower terminus of the abdominal incision; the extent of the displacement of the bladder can be estimated by this. Forceps hold the ureter in place until the sutures are passed. A part of the ureter is seen lifted up free from the pelvic floor.

continues clear: third, that by placing the patient in the dorsal position with elevated pelvis, or in the knee-breast position, the ureters may be catheterized as described, and urine collected from one side while none escapes from the other; fourth, that the sound may be readily entered into one ureter and passed back to the posterior wall of the pelvis, while in the other it cannot be pushed in more than a few centimetres; fifth, in the congenital malformation where there is a double ureter on one side, with one of its openings near the urethra, and the other in the bladder, the evidence that the fistula is not vesical will be obtained by the

injection of milk. The catheterization of both ureters will demonstrate also that they are pervious and functionally perfect.'

Perhaps the most concise manner of describing the closure of a ureteral fistula is to take the description from Howard Kelly of one in the vault of the vagina that resulted from a vaginal hysterectomy. Having first injected sterilized milk into the bladder to prove that the viscus was uninjured, he put the patient in the knee-breast position and inserted his No. 10 cystoscope, when the bladder filled with air and he was able to inspect the ureteral orifices. By introducing a searcher into the left ureteral orifice, he found that this ureter was intact as far as the posterior wall of the pelvis. Upon introducing it into the right one, it could not be carried in more than two centimetres, on account of meeting an impassable obstruction. The urine was seen flowing from the left ureteral orifice, while nothing escaped from the right side. The demonstration was thus complete, that it was the right ureter which was injured, and the left was intact.

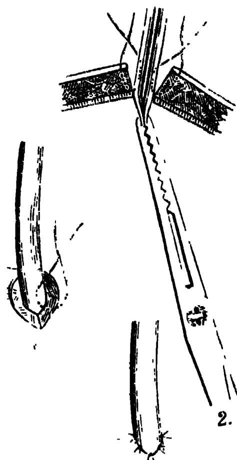


FIG. 605.—2. Schematic section showing the way the ureter was held by forceps, and the relation of the sutures to the coats of the bladder and the ureter. All but the mucous coats of both were included. 3. The appearance of the ureter entering the opening in the bladder. One suture laid in place, but not tied. 4. Shows the snug union of ureter to bladder after both deep and superficial sutures were applied.

Kelly thus describes the operation :—

'The patient was placed in the Trendelenburg position, and an incision 12 cm. long made through abdominal walls loaded with fat. After opening the abdomen, the large fat omentum and intestines were dislodged from the lower abdomen and pelvis with great difficulty, and held away by means of cotton gauze pads.

'The end of the ureter could not be found on the pelvic floor on account of the rigidity and inflammation surrounding the line of scar tissue between the rectum and bladder. The right ovary and tube were also pinned down to this scar tissue by numerous vascular adhesions. The attempt to reach the ureter at this point was therefore abandoned, and it was sought out at the pelvic brim, where it was readily found, after lifting up the caput coli and incising the peritoneum and pushing aside the fat. It was then traced from the point of crossing the common iliac artery down to the pelvic floor, exposing the whole length of the pelvic portion by splitting the peritoneum over its upper surface. The anterior portion of the ureter was involved in the inflammatory material surrounding the scar, which bled so freely that no attempt was made to dissect it out.

Four centimetres of the length of the ureter lying directly posterior to the scar tissue were dissected out, and the ureter lifted up from its bed and divided close to the scar, sacrificing as little as possible of its length.

'The bladder was next dissected free from its attachments to the horizontal rami of the pubis on both sides with scissors and fingers, and dropped down into the pelvis so as to extend it and carry it more into the back part of it, gaining at least 3 cm. in this way. By this means the ureter and the bladder were easily approximated without strain. A small incision was now made through the bladder wall, covered with fat at least a centimetre thick, at the point on the right nearest the ureteral end. This incision passed through the peritoneum, and was not more than 3 or 4 mm. in length, and just large enough to receive the ureter snugly.

'The under surface of the ureter was then split up for about 4 mm., enlarging the calibre of its orifice to avoid a stricture, and a pair of long delicate forceps was introduced through the urethra into the bladder, and through the incision made in its wall the urethral end was drawn into the bladder, and held there while it was being attached to the bladder wall by about six fine interrupted silk sutures, passed through the muscular tissue of the bladder and peritoneal and muscular coats of the ureter on all sides, beginning with the under side.

'The ureter thus dissected out of its bed, and attached to the bladder, was stretched like a lax cord from the posterior part of the pelvis to the bladder, which lay gibbous and flattened out on the pelvic floor.

'The abdominal incision was closed down to its lower angle, where a narrow gauze drain was inserted for fear of leakage. Care was taken, in closing the incision, not to draw together the peritoneum underlying its lower end, to avoid raising the bladder and indirectly pulling upon the ureter.

'No leakage occurred, the drain was removed, and the wound healed without suppuration. The patient's urinary difficulties were immediately and completely relieved with the perfect restoration of continence.'

Kelly has again recently drawn attention * to the value of the renal catheter in determining the seat of obscure pain in the side. In the case of stone in the kidney or ureter, the scratching of the shining surface of the wax-tipped catheter is seen under a hand lens; in the instance of stricture, the grip of the catheter is diagnostic, while in pyelitis, the capillary hæmorrhage, excited by the touch of the catheter, is pathognomonic. More especially, however, he draws attention to the assistance gained in the differentiation of the pain caused by gall stone, renal calculus, some localized affection of the colon, or appendicitis. His method of procedure is as follows: The patient having been placed in the position mentioned in the text, and the catheter introduced, from ten to fifteen cubic centimetres of a bland fluid are injected rapidly into the kidney, distending its pelvis and producing a not too severe attack of artificial renal colic. The patient, locating the pain, can say whether it is in the same position and of the same nature from which she has previously suffered. He quotes some cases of extreme interest, proving how this method of examination enabled him to diagnose between the conditions above enumerated. A boracic acid solution was employed for injection.

* *Amer. Jour. Obstet.*, No. 3, 1899.

Uretero-ureterostomy.

The ureter may be implanted into the bladder or the rectum. Rectal implantation has the objection that an infective nephritis is apt to follow in its train. Full particulars of all operative procedures on the ureter for wounds and fistulæ may be found in the communication of Fenger of Chicago.* Nephrectomy has many times been performed for severe wounds of the ureter when the accident has happened during hysterectomy. Uretero-ureterostomy is Van Hook's method of invagination.† Briefly, the operation is resolved into the following steps: Ligation of the lower portion of the tube one-eighth or one-fourth of an inch from the free end with silk or catgut; one-fourth of an inch below the ligature, a longitudinal incision, twice the length of the ureteral diameter, is made in its wall. The upper portion of the ureter is now incised from its open end for one-fourth of an inch. With two fine cambric needles a loop of sterilized catgut is carried through this end of the ureter, one-eighth of an inch from the extremity, from within out. This loop firmly grasps the ureter. The apertures through which the loop passes are one-sixteenth to one-eighth of an inch apart, and equi-distant from the end of the duct. The two needles now lie free, and are carried through the slit in the side of the lower end of the ureter, passing through the duct-wall for half an inch side by side, and by traction of the loop the upper end of the duct is drawn into the lower portion; and thus, when the ends of the loop are tied securely, the transplantation is effected by the passage of interrupted extra-mucous sutures which complete the union; finally, the operation being intra-peritoneal, the ureter is enveloped in peritoneum.

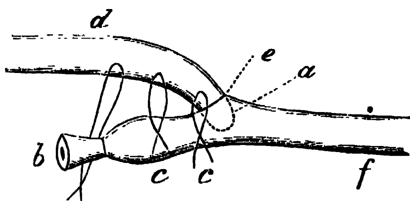


Fig. 606.—Uretero-ureteral Anastomosis (Bloodgood). *a*, Traction suture tied; *b*, ligated end of lower portion; *c c*, fixation sutures; *e*, lower end of upper segment implanted in slit in lower.

Purcell has recorded a case ‡ in which, during the removal of a large carcinoma of the uterus, the ligatures applied to both uterine arteries

* *Ann. Surg.*, Sept., 1894.
† *Jour. Amer. Med. Ass.*, March 4, 1893.
‡ *Brit. Gyn. Jour.*, Aug., 1898.

included the ureters at either side, the symptoms of suppression of urine, together with falling temperature and sickness, indicating the constriction of the tubes. The abdomen was opened two days after operation, and the ligatures were cut, thus freeing the ureters. The patient made a good recovery. At this time I collected the particulars from the kliniks of Martin and Landau of Berlin, also of Kufferath of Brussels, as well as from that of Doyen. Martin's statistics included 2000 abdominal, and 300 vaginal operations. In these, of the abdominal there were 3 cases of injury to the ureter, and in the vaginal 2. Of the abdominal cases he lost 2; 1 from septicæmia, and 1 from uræmia. In all three cases the abdomen was opened. In the third, plastic operations having proved unsuccessful, nephrectomy was performed. The following is Landau's table of 1273 cases:—

	Number of Cases.	Injured Ureter.	
(1) Laparotomies including abdominal hysterectomies	Over 700	Nil	
(2) Vaginal hysterectomy—			
(*a*) For cancer	124	1	Nephrectomy cured. Patient died thirteen months after the operation.
(*b*) Myoma. Among these many reaching to umbilicus (morcellement)	99	5	1 spontaneously closed; 1 closed by Winckel's operation; 3 cured by nephrectomy.
(*c*) Concentric hypertrophy of uterus and uncontrollable hæmorrhage	28	Nil	
(*d*) Inflammatory processes of appendages, complicated pelvic abscess, double pyosalpinx, and double-sided, non-purulent but inflammatory conditions of appendages	270		Both cured by nephrectomy.
(3) Combined operation		Nil	
(4) Vaginal cœliotomy	52	Nil	
Total	1273		

I have myself been so far fortunate as never to have wounded a ureter during hysterectomy.

Kufferath had one death in pan-hysterectomy from injury to the ureter, none in vaginal hysterectomy, none in ovariotomy or oöphorectomy, one in laparotomy for a large fibroma in which the ureter was brought into the abdominal wound, but nephrectomy in this case had subsequently to be performed. Doyen had one case in vaginal hysterectomy for cancer of the fundus, in which there were post-puerperal vaginal cicatricial bands. There was a fistulous opening from the ureter into the vagina. This was closed by lateral incisions of from 15 to 20 millimetres in length on each side of the

ureteral orifice, a transplantation operation being performed, and the ureteral opening closed by a purse suture and the edges of the vaginal flaps reunited over it.*

Kelly divides the treatment of wounded ureter under eight heads. The first two depend upon the principle of directing the urine from the ureter into the bladder by creating an artificial vesico-vaginal fistula close to the ureteral one, and directing it to the opening by either bridging over a channel between the two orifices, or encircling them by a ring of denuded vaginal mucosa, which latter is folded on itself so as to catch the urine before it reaches the artificial opening. Again, the end of the ureter is dissected out and split, so as to prevent contraction, and is then turned into an opening made in the base of the bladder. Or the upper part of the vagina is closed after a vesico vaginal fistula has been formed near the ureteral one in the vaginal vault. In incomplete severance of the ureter, the fistula is closed by denudation and suture. The operation referred to in the text may be performed, or ureterocystostomy. The vagina may be totally occluded—total colpocleisis. Lastly, nephrectomy may be performed.†

Efforts may be made to suture the cut ends of the divided ureter by their resection, and the suturing of the peritoneum over them. The Heineke-Mikulicz method consists in the closure of a small wound by Lembert's sutures; the fistulous aperture may be, as in Doyen's case, invaginated into the bladder, the vesico-vaginal opening having been made. The ureter may be grafted to the bladder through the vagina, or extra-peritoneally by means of an abdominal incision, or by an intra-peritoneal operation, or it may be implanted in the rectum.

* 'Technique Chirurgicale,' p. 347.

† Howard Kelly, 'Operative Gynæcology,' p. 457.

CHAPTER XLIII.

AFFECTIONS OF THE KIDNEY.

THE KIDNEY IN ITS RELATION TO GYNÆCOLOGY.

I HAVE already repeatedly urged the possibility of committing an error in overlooking a renal affection, whether in the form of fluid accumulation or solid growth, when making an abdominal examination. There are many practical points of the greatest importance, bearing on the special relation of renal disease to affections of the pelvic organs in women, that it is absolutely necessary to refer to in a gynæcological text-book. This remark applies more particularly to renal enlargements due to neoplastic formations, cystic growths, distension with water or pus, or from malignant disease.

Rather with the view of emphasizing the need for a recognition of the sources of error arising from forgetfulness of the care required in differentiating certain affections of the kidney from disorders of the pelvic viscera, than of entering into a detailed description of the former, do I include a short chapter on affections of the kidney in this work.

Our knowledge of the pathology, symptomatology, and treatment of the urinary organs has been of late years considerably advanced through the original work of such men as Howard Kelly and Christian Fenger in America, while at home the writings of Henry Morris, Greig Smith, Knowsley Thornton, and Jacobson have done much in the same direction.

The *Bulletins of Johns Hopkins Hospital*, and the *Annals of Surgery*, now mostly collated in Kelly's 'Operative Gynæcology,' contain accurate and full information with regard to the operative procedures of our American *confrères*.

Differentiation and Diagnosis of Renal Enlargements.

Those forms of renal enlargement which we are most likely to confound with affections of the pelvic viscera in women, are not so much those which have associated with them marked renal symptoms, or acute inflammatory conditions and their consequences,

as the enlargements or secondary outgrowths from the organ which may be present without causing pain or any distinct renal symptom. Such are simple cysts or hydatid cysts, hydro-nephrosis, mobile and movable kidney and tumours, such as the fibromata, and lipomata. Though this is so, still such conditions as pyo-nephrosis and peri-nephric abscess have been not unfrequently confounded with ovarian cystoma. Such errors are still more likely to be fallen into if there be associated with the kidney affection any disease of the uterine adnexa, more particularly should this latter involve the ureter. Those cases are very difficult to differentiate in which there is evidence by urinary analysis or local symptoms of kidney implication, at the same time that some enlargement of the adnexa of the corresponding side is detected, and in some of these cases nothing save exploratory incision of the kidney will settle the doubt as to the presence of pus or calculus, and I have known a case in which the kidney was twice explored for a concretion without any result, in the end nephrectomy being performed on a disorganized kidney. No exploration of the kidney is satisfactory save that in which punctures with the exploratory needle are made. I refer, of course, to those cases in which palpation of the kidney does not lead to the discovery of a cavity or calculus.

Landmarks of the Renal Region.

In examination of the kidney by palpation, we have to remember the different relations of the right and left viscus. We may accept as sufficiently accurate for defining the position of the kidney, the lower border of the eleventh rib, and the middle of the third lumbar spine, the situation of the hilum being marked by the level of the first lumbar vertebra. While the right kidney is in close relation to the under surface of the liver above, it has the duodenum and hepatic flexure of the colon lying in front of it, the duodenum almost invariably resting upon its anterior surface; the superior border of the left organ touches the fundus of the stomach, and for its upper two-thirds its outer border is in relation with the spleen. Anteriorly, and along its inner border, is the pancreas, the descending colon lying over its anterior surface below. Such connections show how difficult it is always to isolate the kidney when there are morbid conditions, displacements, or enlargements of the surrounding viscera, and its comparative immobility, as pointed out by Cunningham and Kendal Franks, while due partly to its shape, is also dependent upon the indirect pressure exercised

on its surface by these viscera.* The mobility of the kidney is influenced by the amount of fatty tissue by which it is enveloped. The posterior surface of the kidney, says Franks, exhibits three well-marked areas, which correspond respectively to the psoas internally, to the quadratus lumborum externally, and to the diaphragm above.

I have thus briefly recalled the positions and surroundings of the kidneys, in order that the reader may bear these well in mind in making a manual examination of the organ. It must, however, be remembered that in a large proportion of cases the kidney cannot be felt below the margin of the ribs. Noble states that in three-fourths of the cases examined by him the kidney could not be palpated. This, however, may, as he says, depend upon the difficulty of detection of the lower margin of the kidney in a clinical examination. Another practical point to remember is that the kidney moves slightly in inspiration, descending with the descent of the diaphragm.

Examination of the Kidney by Palpation.

The kidney may be palpated with the patient in three different positions—in the dorsal position, with the head and trunk well raised; in the prone, bending forwards over the end of a couch; or standing. In cases of doubt and difficulty it is well to examine in all three positions. If in the dorsal position, one hand is carried under the renal region, and the other is placed over it in front on the abdomen. By deep pressure and movement of the fingers any enlargement or tenderness may be detected. This is further facilitated by making the patient turn a little towards either side. While she is lying on her back, it is advisable to carry a hand behind each kidney, and, by simultaneous and alternate pressure, relatively gauge any difference in size which may exist.

In the second position, the patient leans forward over the end of a fairly high couch, the waist being supported by a firm pillow. The renal region of both sides is bimanually palpated. In the third position, the patient, who is standing, leans slightly forward, with the hands resting on a table, and the lumbar regions are then examined as in the other methods. The principal swellings at the right side, which have to be borne in mind as likely to be mistaken for enlargements of the kidney, are a duodenal tumour, a distended

* *Jour. Anat. and Phys.*, July, 1895; *Brit. Med. Jour.*, Oct. 12, 1895.

gall-bladder, an omental tumour, disease in the hepatic flexure of the colon, impacted fæces, and a pyloric growth; at the left side, splenic enlargement, an omental tumour, or disease of the descending colon.

With a view to keeping in mind the various sources of renal enlargement, I place these in tabular form, and have to express my indebtedness to the work of Knowsley Thornton for the complete summary.

*Causes of Renal Enlargement.**

It is well in the first place to enumerate the principal sources of pelvic enlargement.

Fluid Enlargements—

Hydro-nephrosis.
Pyo-nephrosis.
Renal abscess.
Peri-nephric abscess.
Suppurative nephritis.
Scrofulous kidney.
Simple cysts.
Hydatid cysts.

Any of these conditions may be complicated with calculus in the kidney or ureter.

Simple Neoplasms—

Fibromata ... } Inflammatory; Simple; Cystic; Muscular; Fatty.
Lipomata ...

Hæmatangiomata.
Osteomata.
Adenomata ... } Papillary; Glandular.

Malignant Neoplasms—

Sarcomata (various kinds).
Lymph adenomata.
Carcinomata (various kinds).

* See Knowsley Thornton's 'Harveian Lectures,' 1889.

Hydro-Nephrosis (congenital or acquired)—

Is a distension of the kidney with fluid caused by obstruction to the flow of urine. (Liable to be confounded with ovarian cystoma.)

Pyo-Nephrosis—

Hydro-nephrosis, accompanied by suppuration. (Very liable to follow calculus or traumatic puncture of the hydro-nephrotic cyst; it may cause cystitis.)

Renal Abscess—

Generally the result of injury, calculus, or foreign body; or it may follow the administration of cantharides or turpentine.

Peri-Nephric Abscess—

Abscess in the cellular bed outside the kidney. (*a*) Primary and independent of the kidney; (*b*) secondary to suppurative nephritis, renal abscess, or pyo-nephrosis; (*c*) secondary to renal fistula and urinary extravasation and calculus.

Suppurative Nephritis—

Suppurative inflammation of the kidney, either of its pelvis (pyelitis) or of the entire organ (pyelo-nephritis). It is usually a secondary and acute inflammation, attacking both kidneys, and rapidly fatal.

Scrofulous Kidney—

Tuberculous degeneration of the kidney—generally both organs—ending frequently in abscesses (pyelitis or nephritis). The ureter and bladder are often involved.

Simple Cysts—

Spring from the cortex; contents vary in character; serous, albuminous, or of a colloid nature; do not contain urine.

Hydatid Cysts—

Generally originate in the renal tissue; occasionally from the subcapsular cellular tissue. May assume large size, and be mistaken for ovarian cystoma.

Fibroma—

A renal fibroma may assume an enormous size. Bilroth removed one weighing 40 lb., and Spencer Wells two fibro-lipomata weighing $16\frac{1}{2}$ lb. and $14\frac{1}{2}$ lb. respectively. They may degenerate into fibro-cystomata or fibro-lipomata.

Lipoma—

Originates in the adipose areolar tissue, and forces its way into the hilum of the kidney.

Hæmatangioma and Osteoma—

Very rare.

Adenoma—

(*a*) Papillary—more common as originating in the tubules and Malpighian capsules; (*b*) Glandular—are more frequent in the cortex. (Knowsley Thornton describes a kidney which was affected with calculus and papilloma of the pelvic end of the ureters, causing hydro-nephrosis.)

Sarcoma—

The same author, in accounting for the recurrence (after removal) and malignancy of sarcoma of the kidney in children, and its non-malignancy in the adult, says—

'The difference is to be sought in the varieties of sarcoma most common in early life, and in the adult; and, secondly, in the portion of the organ first invaded by the disease.' In children he notices the prevalence of the cell element approaching the embryonic type; the intercellular substance is soft and full of fluid. In the adult there is less of the cellular and much more abundant intercellular tissue, which is dense and hard, and of slower growth, the capsule alone being commonly attacked, while in children the entire renal substance is infiltrated.

Lymphadenoma—

Is accompanied by evidence of the disease elsewhere.

Carcinoma—

Encephaloid is the form most frequently met with; next, scirrhus; and, lastly, colloid.

I have thus summarized the different enlargements of the kidney in order to impress on the reader the necessity for being on his guard in arriving at a diagnosis in some cases of obscure abdominal tumour, and even in cases in which the nature of the disease seems at first sight obvious. Remembering that hepatic and renal tumours may both complicate and simulate ovarian-uterine tumours, he must not forget so to investigate all suspicious cases, as to eliminate those sources of error that might perhaps lead up to a useless or fatal laparotomy. In the instance of the liver, the evidences of hepatic disease (*vide* chapter on 'Ovarian Tumours') are to be sought for in the area, site, and connections of the tumour; icterus; emaciation; sickness; constipation; and ascites. In the case of the kidney, we

must, in addition to the local and constitutional evidences of renal disorder, most carefully examine the urine for the presence of albumen, pus, mucus, or débris of renal tubes and epithelium.

I have already referred to a case of obscure abdominal tumour complicating a uterine affection, ensuing in a movable kidney, and in which nephrectomy was performed, the disease proving to be carcinoma; and to another, in which I mistook, for an enlarged and movable kidney, a case of hepatoptosis. I have been sent for in a case diagnosed as ovarian tumour, and in which the doubt as to diagnosis was solved by aspiration of an enormous quantity of purulent fluid, the result evidently of a pyo-nephric abscess. The great size to which renal tumours may grow explains the occasional excusable error of mistaking such growths for ovarian or uterine, and it must not be forgotten that renal and pelvic neoplasms may co-exist in the same patient.

In dealing with the conditions most nearly touching the province of the gynæcologist, Knowsley Thornton, in his 'Harveian Lectures,' thus speaks of hydro-nephrosis and renal tumours :—

Hydro-Nephrosis: Differentiation from Ovarian Cystoma.

'This is not always easy; retro-peritoneal, omental, and mesenteric cysts are especially difficult to differentiate from hydro-nephrosis, and it has been a common error to mistake an ovarian cyst for hydro-nephrosis, or *vice versâ*. It is also in some cases difficult to distinguish between hydro- and pyo-nephrosis. The position of the colon, curving across the tumour, is one of the best diagnostic points in renal tumours, giving a clear note on percussion over their inner border. Sometimes this is lost through the intestine being contracted and empty, but even then it can often be defined as a raised cord, which varies in shape under pressure. In very large tumours the bowel sometimes gets behind, and this sign is altogether lost. I have seen some retro-peritoneal cysts which it was quite impossible to distinguish from hydro-nephrosis till the abdomen was opened, and in one case I did not discover what the tumour was till I had enucleated a considerable portion of it, so exactly did it simulate a distended adherent kidney. There should, however, be no difficulty in differentiating a hydro-nephrosis from an ovarian cyst, and yet they are frequently mistaken for one another. In the former there is the position of the colon, the dulness going far back into the loin and under the ribs, and nearly always a clear line between the lower edge of the tumour and the iliac crest. In the ovarian cyst the dulness and fluctuation rarely go so high and so far back, and though its upper margin is often overlaid by clear intestine, there is not the same fixed curve of clear note, and the dulness extends down to the iliac crest and pubes. The ovarian cyst has usually more lateral mobility than the renal cyst. The pelvic examination alone will usually distinguish the one disease from the other.

The hydro-nephrosis rarely becomes pelvic; the ovarian tumour is nearly always more or less so. If the lower part of the hydro-nephrosis should enter the pelvis, its close connection with the bladder can be traced, while pressing up its abdominal portion does not affect the uterus, the exact reverse being the case for the ovarian cyst. Careful aseptic puncture far back in the loin and examination of the fluid removed are, however, the only certain means of diagnosis—at any rate, in many of the cases.'

Renal Tumours—Diagnosis.

'The tumours most likely to be mistaken for renal tumours are: (1) *Retro-peritoneal cysts;* often quite impossible to diagnose from hydro-nephrosis. (2) *Omental cysts;* easier on account of the different relations of the bowel. On the right side (3) *Distended gall-bladder*, when surrounded by adhesions, quite impossible to differentiate in some cases from renal tumour; when free and mobile, its exact relations are easier to define. (4) *Enlargement of the spleen;* this ought not to be mistaken for renal tumour: first, there is the notch, always to be found with careful search; then there is the hard, sharp border, quite different from any renal tumour; then the percussion is dull to the very edge of the tumour; the intestine never overlaps unless it is adherent, which is very rare. (5) *Ovarian tumour. A sub-peritoneal fibro-myoma uteri* might be very difficult to differentiate from a renal tumour, when the latter was large enough to dip into the pelvis.' 'Thornton operated upon solid sarcomata of the mesentery and retro-peritoneal cellular tissue, which it was quite impossible to distinguish from renal sarcoma till the abdomen was opened.'

Temporary Disappearance of the Renal Swelling.—There is one point of importance in regard to certain enlargements of the kidney not to be forgotten, and which may both puzzle the practitioner and reflect unpleasantly on his opinion, viz. *the chance of a temporary subsidence or disappearance of the tumour.* This may happen in the case of hydro-nephrosis or pyo-nephrosis, when the fluid, which has been imprisoned by some obstruction—as, for instance, a calculus in the ureter—passes into the bladder through removal of the impediment, and a previously blocked ureter becomes pervious; or it may occur in the instance of a movable kidney, the shifting or displacement of which may depend on posture or occupation.

MOVABLE OR DISPLACED KIDNEY—*Ætiology.*—The only affection of the kidney that I propose to deal with in any detail is that of movable kidney.

A distinction has been drawn (Jenner) between 'movable' kidney and 'floating' kidney, the latter term being applied to that form of displacement in which there is a meso-nephron or fold of peritoneum attaching it to the vertebral column. This is by far the rarer

variety of displacement. It is at times a congenital malformation. Displaced kidney may follow from shock, falls, blows, or other injury.

The inexperienced practitioner may be excused for overlooking an affection the symptoms of which, in the milder forms of displacement, are often obscure. The fact, however, that movable or floating kidney is found much more frequently in women than in men (in the proportion of seven to one), and that it is still commoner in those women who have borne children than in the unmarried, in consequence, probably, of the greater laxity of the abdominal wall in the former class, invests this renal affection with special interest in the eyes of the gynæcologist. Any prolonged or exhaustive drain on the system, which weakens the abdominal parietes and causes absorption of the circumrenal fat, is apt to predispose to loosening of the kidney.

For example, I have frequently found movable kidney in women who have suffered from exhaustive discharges, such as severe hæmorrhage, from hæmorrhoids, after pregnancy, and in cases of malignant disease. 'With one exception,' says Noble, 'all the patients having a movable kidney that I have seen have been thin.'

Renal displacement is seldom met with in very young patients. The right kidney is generally the one most frequently found mobile. 'Women,' says Greig Smith, 'with long flexible spines and sloping lower ribs, which do not rise well forwards, but lie closely over or in contact with the kidney, provide the most abundant examples of this condition.' Hypertrophy of the kidney, or other tumour, may be the cause of the wandering or mobile kidney. A patient who suffered for some years from a pyo-nephritis consulted me. I found the left kidney so reduced in size that it was impossible to prove its presence. The right kidney was greatly hypertrophied, and freely movable.

Diagnosis.—I have already fully described the method of examining for a movable or displaced kidney. We have to differentiate displaced kidney from a tumour of the pancreas, liver, gall-bladder, pylorus, and omentum, or a fæcal tumour of the colon. But what is of still greater importance for the gynæcologist to recollect is, that movable kidney, especially when enlarged, has been mistaken for ovarian cystoma, extra-ovarian cysts, hydro-salpinx, and pyo-salpinx. In any case of doubt, therefore, careful examination of the abdominal and pelvic viscera should be made before a conclusion is arrived at. The tumour gives a characteristic mobile sensation

to the hands, and manipulation is sometimes attended with pain, and this may last for some time after the examination is over.

In women with lax parietes and general looseness of the abdominal organs, or in those in whom the parietes are very resisting, a distended gall-bladder may easily be mistaken for a mobile kidney. The two conditions may also co-exist. Greig Smith, referring to the oblique direction of the growth of the gall-bladder tumour, points out that the tumour has grown before we have seen it, and is 'too small to have any definite direction.'

The superficial position of the gall-bladder will not help us if the intestines, in palpation, rise above it, and in the case of a very mobile kidney, in a thin woman, the kidney appears to be directly under the hand when she is turned on her side. However, it may be safely said that such cases of difficult diagnosis are very rare, and that the detection of a movable kidney, in the great majority of cases, is comparatively easy. In such exceptional cases, only by careful percussion and palpation in different positions is a decision to be arrived at. Other sources of error must be avoided by attention to the particular symptoms likely to accompany them. The gastric disturbances will warn us not to overlook the possibility of a pyloric growth, which, as Greig Smith points out, glides from under the palpating fingers directly upwards, and not upwards and backwards, as in the case of the kidney. The situation, however, of the pyloric tumour, and its fixed position, are quite distinctive features in this case. The sensations of faintness and sickness frequently complained of in handling a floating kidney are also helps in arriving at a conclusion.

Symptomatology.—Both the signs and symptoms of renal displacement will depend upon its degree, and whether one or both organs are mobile. Those attending slight displacement are frequently so mild in character that they may not arouse the suspicion of the surgeon as to the real cause of the temporary pain or distress, which is only periodically complained of. I have frequently seen cases with single or double movable kidney in whom the discovery has been accidentally made in an abdominal examination, called for by symptoms of a pelvic affection or gastric disturbance where there was no suspicion of any abdominal tumour. Some of these patients sought advice for aggravated dyspepsia and gastrodynia or other reflex pains. If a woman complains of a constant or recurring pain in the lumbar region, occasionally extending up the side or downwards to the groin, or which is increased by exercise, and in all cases where there is a history of

obscure gastric trouble, we must carefully exclude movable kidney as a possible source of the symptoms.

There may be occasional attacks of syncope caused by pain, which varies with the degree of mobility and the size of the kidney. After a time the organ may be, and frequently is, enlarged. Hydronephrosis or pyo-nephrosis may be present. Such an enlarged, hydro-nephrotic, movable kidney I have been recently consulted for in a middle-aged woman. The tumour then may fill the space between the crest of the ilium and the last rib, and much of the previous mobility may disappear. In cases in which this displacement has lasted for some time the general health suffers more or less. There is frequently sickness or nausea. The patient becomes nervous, and loses flesh more rapidly; the pain is more constant, constipation is frequently present, as are the other natural results of want of exercise and loss of appetite.

A young girl was sent to me who had been twice in hospital with symptoms of gastric ulcer. Each time she became somewhat better for the treatment, but after a while the trouble recurred, and when I saw her it was a question of having to give up her employment from the constant pain and nausea. She was also greatly reduced in weight. On examination I found a large and very mobile right kidney. I performed nephrorrhaphy, and since her recovery from the operation, which was rapid, she has had no return of the symptoms, and is quite restored to health.

Treatment.—Outside the general indications for the constitutional conditions that complicate a mobile kidney, the special treatment resolves itself into the use of a well-made support or the operation of nephrorrhaphy. The operation of nephrectomy is not by any surgeon to be named in discussing simple, uncomplicated movable kidney. I have made several women fairly comfortable, though both kidneys were mobile, who were able to go about their household and other duties wearing a kidney-belt with double supports. The form I prefer is that shown (Fig. 607). A light steel plate is incorporated with the web lining; this is well padded, or can be covered with an air-pad. The plate is sufficiently large to cover comfortably the renal region. In the front

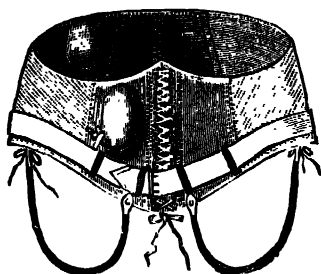


Fig. 607. — Author's Belt for Movable Kidney, with India-rubber Inflating Pad, Leather Convex Back Pad, and India-rubber Under-straps.

of the belt is another air-pad, with a stop-cock attached, so that it can be increased or diminished in size at pleasure. I find this double support, behind and in front, far preferable to the belt ordinarily sold, with the pad only behind. I also think that the curved plate of steel, about the width of the palm of the hand, is more resisting and efficient than the air-pad posteriorly. Should such support fail to give relief, and the patient be willing to undergo nephrorrhaphy, the operation may be performed. The steps of this operation are briefly the following :—

Nephrorrhaphy.

The patient having been laid in the proper position, an oblique incision to expose the kidney is carried from the outer border of the erector spinæ, half an inch below the last rib, towards the crest of the ileum, for the extent of three inches ; the length of the incision must, however, depend upon circumstances. This incision divides the skin, fat, and fascia, and exposes the outer edge of the latissimus dorsi and the posterior border of the external oblique. The deeper part of this incision should correspond in extent with the skin wound. When the aponeurosis of the internal oblique and transversalis has been sufficiently divided, the quadratus lumborum muscle is exposed and retracted, and, lastly, the lumbar fascia is cut to the extent of the entire wound. Forcipressure is used for the control of bleeding vessels. The perirenal fat and fascia having been well exposed by retractors, the fat, save in rare cases, when it is closely adherent to the capsule of the kidney, is opened, and the viscus is exposed. The aseptic finger is then freely used to determine the degree of mobility, and to excite plastic adhesions. The next step consists in thoroughly freeing the kidney of its fatty tissue, so as to get the kidney to lie on the muscular structure. The capsule is now scratched with a blunt needle or the finger-nail. The kidney, thus completely freed, is drawn into the abdominal wound. Buried sutures are passed, two or three in number, with a blunt-pointed needle, through the substance of the kidney, an inch from its free margin, a drainage-tube is inserted, and the wound closed. The entire operation, from first to last, is aseptically conducted.

Puncture of the Kidney.—In cases where we are in doubt as regards the nature of a renal swelling, or the character of the contained fluid, aspitation is the proper preliminary step to take. 'An abundant experience of this very simple operation,'

says Greig Smith, 'proves that it is too frequently allied to the experiment of introducing a germ-laden needle into the midst of a cultivation jelly.' Thus he accentuates the care which ought to be taken to asepticize the needle-point and fill the puncturing-needle of the aspirator with some antiseptic fluid in making the puncture. In gynæcological practice—to which alone I refer—this step is undertaken both as a means of diagnosis and as a therapeutic measure, in order to draw off the fluid. Morris recommends as the point of entrance of the needle *on the left side*, '*just anterior to the last intercostal space;*' *and on the right side*, '*a point half-way between the last rib and the crest of the ilium, from two to two and a half inches behind the anterior superior spine of the ilium.*'

Though a needle passed horizontally inwards at this spot is 'altogether in front of the normal kidney, and will either transfix or pass in front of the ascending colon when in its usual place,' Morris points out that in enlargement of the kidney of the right side, in cases of hydro-nephrosis of the right side, if the needle be directed somewhat forwards, both peritoneum and colon will escape, and the pelvis of the kidney will be tapped at its anterior and lower aspect.

The needle is directed sufficiently forwards to escape the kidney, but not so far as to endanger the colon and peritoneum. The greatest care must be taken when the fluid is escaping, and the cavity is nearly empty, not to push the needle further in, so as to avoid the risk of wounding either the renal vessels or the peritoneum.

This operation, we must remember, is both curative and diagnostic. Its performance will often save the necessity for a nephrotomy, or possibly a nephrectomy, and is always indicated in the case of *simple cysts*, *hydro-nephrosis*, and *hydatid cysts*.*

Renal Calculus.—I only refer here to the subject of renal calculus in order to draw attention to the obscure symptoms which frequently accompany the presence of a concretion in the kidney. If, however, in all cases where there is frequent micturition, with associated pain in the lumbar region, extending to the groin, a careful examination of the urine be made, combined with palpation of the kidneys and ureteral exploration, at the same time that such causes of urinary distress and disturbance as uterine displacements, pelvic tumours, and adnexal disorders, be excluded, the diagnosis of renal calculus may be fairly arrived at. Still, as I have said, nothing save renal exploration will in some cases clear up the doubt.

* See Greig Smith's 'Abdominal Surgery,' 6th ed., vol. ii.

As bearing on the uncertainty of symptoms, even in a large calculus of the kidney, the following case of Spanton of Hanley is of interest:—

Renal Calculus.

The symptoms were fairly characteristic of stone in the kidney, leading up to pyo-nephritis. The patient, who had had eight children, 'twelve months ago first felt pain, but thought it was indigestion. Two years since she over-walked herself, and on returning passed urine of a dark purplish colour, but the urine was natural afterwards.

'About two months since first noticed small swelling in right iliac region; this caused more pain than patient remembered having before, but even this was not severe; no pain on micturition. Passed urine about eight times in

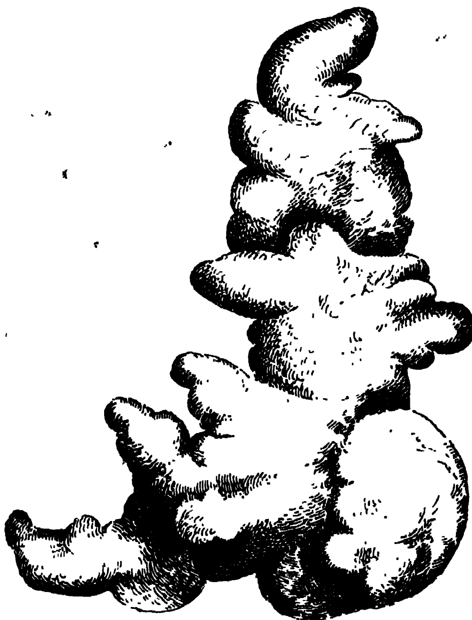


Fig. 608.—Phosphatic Calculus removed from Right Kidney. Weight 980 grains. Exact size. (Spanton.)

twenty-four hours. Urine, patient thought, had a thick sediment in it for the past twelve months. Specific gravity 1025, containing much pus, about 20 ounces in twenty-four hours.'

During operation several ounces of fœtid pus and urine were drawn from the kidney. The patient was operated upon twice before the entire calculus could be removed.

An interesting feature of the case was the comparatively slight local trouble present, nor was there any history of renal colic. There was, however, considerable wasting, with great weakness. The patient made a complete recovery.

CHAPTER XLIV.

SOME AFFECTIONS OF THE RECTUM.

THE affections of the rectum in women which the practitioner is called on to diagnose and treat are:

Proctitis.
Gonorrhœal proctitis.
Impaction of fæces.
Fistula.
Abscess.
Hæmorrhoids, external.
,, internal.
Simple ulceration.
Fissure.
Stricture.
Malignant disease:
  Epithelioma.
  Scirrhus.
  Encephaloid.

Malignant disease (*continued*):
  Colloid.
  Melanosis.
Syphilitic disease:
  Various cutaneous affections of the anus.
  Ulceration.
  Stricture.
Pruritus ani.
Foreign bodies in the rectum.
Procidentia.
Polypus.
Rodent ulcer.

I referred briefly in the first chapter of this work to the anatomical points of importance which have a special bearing on the examination of the rectum, and its clinical relationships to the other pelvic viscera; also to the value of rectal exploration in making a diagnosis, especially in children.

I cannot deal exhaustively, in a manual of this nature, with the treatment of the various diseases of the rectum I have enumerated.

A few general observations, however, regarding those affections which we have most frequently to treat in women, I think it desirable to make. Though some of these are not specially applicable to women, still, they are all of such importance that

I cannot refrain from insisting here on the necessity for observing the rules and precautions included in this brief chapter.

Examination.—To examine the patient for rectal disease, place her on her right side or back, with the knees well drawn up. Previously have an enema administered. In cases in which there is excessive sensitiveness, or where a thorough exploration is required to diagnose the presence and extent of malignant disease, painful ulcer or fissure, an anæsthetic should be given. The necessity is clear to examine the rectum if there be—

A sense of fulness and pain in the neighbourhood of the anus.
Pain on defæcation.
Prolapse of the bowel.
Hæmorrhage.
Discharge of any kind.

Without an anæsthetic, after an enema is administered, the patient can be made to expose the bowel by bearing down, and thus the practitioner can touch with the finger a higher spot in the bowel. *He must trust to the education of the finger in examinations of the rectum rather than to the assistance gained from any speculum.* He should learn to recognize by touch *the uneven and roughened feeling of ulceration, the characteristic hardness of malignant disease, the smooth but tense feeling of hæmorrhoids, the contraction that is the result of stricture, the chink of a fissure, the pedunculated attachment of a polypus, and the internal aperture of a fistula.* Above all, he must not be misled by the common statement of a patient that she suffers from 'bleeding piles,' and be satisfied with her assurance on this point, even though she tells him that she has been under treatment for piles. It has fallen to my lot to see patients who never suspected there was anything more serious than a hæmorrhoidal state of the bowel, yet, on examination, advanced malignant disease has been discovered, or more frequently a fissure or ulcer. In all cases where doubt exists, and the patient resists examination, an anæsthetic should be given. The dilatation of the sphincter is easily effected under anæsthesia; and when this is done, as it should be, slowly and without force, we can, with a suitable speculum or retractors, completely explore the rectum.* Simon's method of examination has already been referred to.

Eversion of the rectum in multiparæ may be secured by

* See p. 110.

pressing on the tube, with the fingers carried into the vagina (Storer).

We may adopt the same method of examination and illumination of the rectum as in the case of the bladder, using a proctoscope and forehead illumination. The position in which the patient is placed is the same as when examining the latter viscus. The accompanying drawing from Kelly's work sufficiently explains this.

Proctitis.—Causation and Symptoms.—Inflammation of the rectum is attended by the usual symptoms of pain, smarting, heat, throbbing

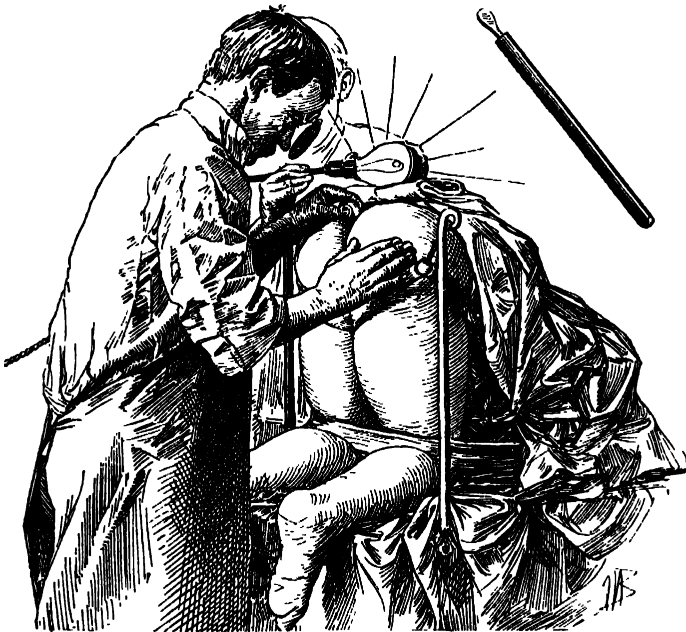


FIG. 609.—EXAMINATION OF THE RECTUM WITH PROCTOSCOPE. (Howard Kelly.)

sensation, and some swelling of the anus. In women the cause of the inflammation may be due to the contact of infective discharges from the vagina. It may supervene upon the attack of a zymotic fever, or may be brought on by the presence of any foreign body in the bowel. In gouty states of the system, when constipation is present, any exciting cause may bring about an attack which may lead to abscess and fistula. We have already referred to the spread of gonorrhœal infection from the vagina to the rectum.

Fritsch, in explanation of the obstinate nature of gonorrhœal

proctitis, refers to the persistence in the discharge of the gonococcus, and he thinks that many of the supposed specific ulcers of the rectum are really due to gonorrhœal virus, the cocci being found six months after the original attack.

Treatment.—When such symptoms are present, a few leeches applied round the anus, warm fomentations, hot sponging with solution of hazeline and laudanum, eucaine or cocaine suppositories, warm boric injections of hot water with laudanum, and rest in bed, will afford relief. Should the infection be due to gonorrhœa, disinfectant lotions of mercuric perchloride (one-sixteenth of a grain to the ounce), or of permanganate of potash, and injections of boric acid into the bowel, should be used, and perfect cleanliness enforced. The rectum must always be gently but carefully explored. Such local treatment is combined with the administration of gentle laxatives, such as some of those recommended under the head of aperients.

Impaction of Fæces and Fæcal Tumours.

Experience has taught me how extremely careful we must be, in cases in which obscure abdominal symptoms are present, not to overlook the possibility of a fæcal accumulation in some portion of the intestine. *I have known a fæcal tumour mistaken, through the signs and symptoms it caused, for ascites, malignant tumour, ovarian dropsy, and aneurysmal enlargements of the abdominal aorta.* Many times I have seen fæcal accumulations in the rectum, the result of habitual neglect of the bowel in women, aggravate, if they have not brought about, various forms of uterine disorder. It is always well for the practitioner to be on his guard, and to recollect that *the presence of a fæcal accumulation in the bowel is quite consistent with semi-liquid motions and a certain degree of response to laxative or aperient medicines.* A fæcal concretion may exist anywhere in the colon, and either at the side of it, or possibly by tunnelling the mass, this semi-solid evacuation may escape.

When there are symptoms of obstruction, and on examination the rectum is found blocked with a hard mass of fæces, the bowel should be emptied by the finger or scoop under an anæsthetic. The amount of fæcal matter that may come away in these cases is astonishing. In such cases I dilate the sphincters thoroughly under chloroform, and remove the masses with my hand. A patient was suffering from fissure, and had encouraged the accumulation of an enormous mass of hard fæces rather than permit

the bowel to move. Under chloroform I dilated the sphincters, removing the masses with my hand, using, as I always have done, in such cases, a large enema of almond oil and thin gruel immediately afterwards. In another most interesting and obscure case of suspected abdominal tumour, I emptied the bowel in the same manner, and the patient was permanently relieved. The student or practitioner can draw his own conclusions from the outline of such cases. I have removed from the rectum of female patients foreign bodies which have caused obscure symptoms; in one case a fish-bone, and in the other a portion of wood, was the offending tenant. The possibility of this cause of rectal or ischio-rectal abscess should not be overlooked.

Thorough dilatation of the sphincters under anæsthesia I have already alluded to as a preliminary step in the treatment of obstinate and chronic costiveness.

Fistulæ.

Causation.—Injuries, foreign bodies, zymotic fevers, hæmorrhoids, syphilis, tubercle. They may be intra- or extra-rectal in their origin, the primary abscess or ulceration commencing in the mucous membrane, in the submucous tissue, in the subcutaneous cellular tissue about the anus, or more deeply in the ischio-rectal fossa.



FIG. 610.—RECTAL DIRECTOR AND PROBE.

Fistulæ are *complete*, opening into the bowel either above the internal sphincter or more commonly between it and the external; *blind external*, which is a blind external canal, as it has no internal aperture; and *blind internal*, which has no external opening. The direction of the sinus of the latter fistula may be suspected by the position of the external orifice; if this be posterior to the transverse axis of the anal opening, the fistulous aperture is in the middle line, while, if the external aperture is in front of the transverse axis, the sinus is straight, and the internal opening is directly opposite to the external (Goodsall).

In the case of *a horseshoe fistula* there are two apertures, usually dorsal and posterior to the anus, communicating with each other by a curved or crescentic canal.

Treatment.—The extent of any abscess that forms in the region

of the anus or perinæum can be previously ascertained by a recto-vaginal exploration. The swelling is made tense by pressure on it from the rectal side. It is then freely opened at a right angle to the anus with ordinary antiseptic precautions. Thorough healing should be secured by dressing the abscess cavity, when it has been completely cleansed, with a carbolized solution, by passing into it a strip of iodoform gauze and getting the wound to heal from the bottom.

General Rules.

1st. All abscesses about the region of the anus and perinæum should be opened early (with ordinary antiseptic precautions).

2nd. Be careful, in women, of too free division of the sphincter in operating for fistula; unfortunate consequences from the difficulty of retaining flatus or fæces may be the result.

3rd. Be rather over-cautious in operating for fistula when it complicates tubercular phthisis; but if the case be not far advanced, and strength be returning, the propriety of operating should be considered.

Fistula in Ano is best operated on by the knife. Dittel's method by means of elastic ligature for cutting through the fistula is seldom practised. As regards fistula, I would emphasize these precautionary rules:

(1) Do not be tempted to temporize with a fistula, complete or incomplete; delay, in the large proportion of cases, only leads to more extensive burrowing, and renders its inevitable division a more serious step.

(2) Divide a fistula thoroughly with the sphincter muscle.

(3) In operating make a careful search for by-channels and burrowing sinuses in the track of the parent canal. Open these also freely.

(4) Make a blind internal fistula complete, and divide the sphincter.

(5) Dry wool, or wool with boric or thymol ointment, is the best dressing after operation. Do not overdo dressing; it is apt to irritate and create discharge, or delay the healing process. A little Condy's or chinosol solution will keep the part clean.

If the fistula should be of the 'horseshoe' kind, it must be opened in the manner advised by Swinford Edwards: 'Pass through the internal orifice a probe-pointed director, and on its point incise the skin in the middle line behind; now push the director through

and slit up. Secondly, slit up the lateral sinuses on directors passed in at each external opening and brought out through the dorsal incision.' Thus a T-shaped incision results. Also, off-sinuses can be opened from the main track, and the sphincters are wounded as little as possible.

Other Methods of Treatment.

For my own part, I only believe, speaking generally, in the cure of a fistulous sinus by dividing it with the knife. Other means may be tried, and I have cured small fistulæ by means of the galvano-cautery. Free dilatation of the sphincters, followed by the application of carbolic acid or chloride of zinc to the fistulous canal, while the external orifice is kept open, may be tried; but all these processes are tedious, and eventually, as a rule, end in recourse to operation by the knife.

HÆMORRHOIDS.

Women are specially liable to hæmorrhoids. I will not delay here to enter into the question of the causation and structure of piles. It is sufficient to say that *external* hæmorrhoids, and the resulting tags of loose skin that fringe the anus, are receptacles for impure discharges, both rectal and vaginal, which dry in the chinks between the folds. This tends to cause rectal irritation, to lead to fissure and pruritus ani, or proctitis. *Internal* hæmorrhoids cause a wearing pain and distress in the sacral region, often extending to the thighs. They are frequently the source of mental depression and irritation. If they bleed, they deteriorate the general health, and in many cases I have known them, at the time of the climacteric, to lead to a serious degree of anæmia. The general treatment and ordinary therapeutic measures to be adopted in the case of piles are summarized under the head of 'General Therapeutic Hints,' p. 883.

Question of Operation during Pregnancy, and where there is an Associated Uterine Affection.

Unless there be some good reason to the contrary, it is best *not* to operate on a pregnant woman for piles. But if the hæmorrhage be severe, then the piles should be removed, and the remote risk of miscarriage occurring must be taken. It may be also looked upon as a safe rule, that where there is any attendant uterine affection, such as a severe erosion, endometritis, or a displacement, it is better

to first rectify the uterine error before proceeding to operate for the internal hæmorrhoids.

With regard to choice of operation for hæmorrhoids, I decidedly believe that the safest operation and most satisfactory is by ligature. I have never had occasion to regret operating by this method, both as regards the effectiveness of the cure and the freedom from hæmorrhage. In all the cases I have done, I have never had a fatal issue, though this retrospect includes every conceivable degree of hæmorrhoidal condition and attendant prolapse. I am aware that the clamp is a cleaner, more rapid, and equally effective method (especially the crushing clamp of Pollock), but to the practitioner operating on women with relaxed tissues and large venous hæmorrhoids, and perhaps living at a distance from the operator, I would say, operate by the ligature. The strong non-absorbent silk is best, such as is used in the operation of ovariotomy. No matter how brilliant and pleasant be the results in the large proportion of cases with the clamp, or clamp and cautery, the surgeon may in some unexpected cases be caught, and find it difficult, if not impossible, to stop the hæmorrhage. *'I do not think,' says W. Allingham, 'in the whole range of surgery there is any procedure worthy the name of "operation" which can show a greater amount of success or a smaller death-rate than the ligature of internal hæmorrhoids.'* *

The occurrence of the menstrual period must be inquired into before operating. It is not prudent to operate on the rectum when menstruation is approaching; we should select the time between two periods.

Operations for Hæmorrhoids.

The appliances necessary for the ordinary minor operative measures required in affections of the rectum are:

A few specula.
Rectal probes and director.
Pile scissors, flat and curved.
„ forceps.
„ hook.
Straight spring scissors.

* Of 4013 cases of hæmorrhoids ligatured at St. Mark's Hospital, there were five cases of tetanus and one case of doubtful pyæmia. The death-rate from all causes in operation by ligature in the hospital during a period of over forty years was 1 in 670; four of the five cases of death from tetanus occurred during a year (1858) when tetanus was rife in London.

Blunt and probe-pointed bistouries.
Curved scissors.
Clamps.
Strong Chinese silk and gut ligature.
Forcipressure forceps (Péan's).
Curved needles.
Needle-holder.
Paquelin's or the galvano cautery.

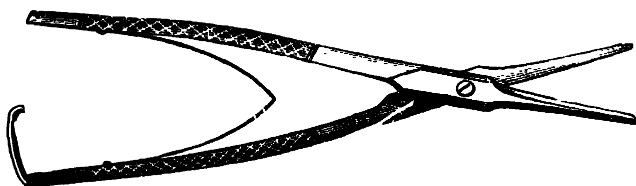


FIG. 611.—STRAIGHT (SPRING) PILE SCISSORS.

FIG. 612.—PILE FORK.

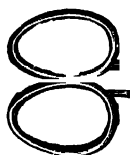


FIG. 613.—PILE SCISSORS BENT ON THE FLAT.



FIG. 614.—CATCH PILE FORCEPS.

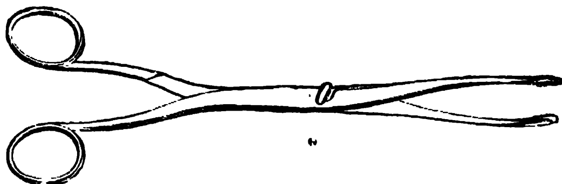


FIG. 615.—PILE FORCEPS.

Excision of External Hæmorrhoids. This is best effected with the straight spring scissors (Fig. 611). The pile is simply snipped off. If there be loose tags of skin which fringe the anus, they are seized and cut off in the same way. The practitioner must be careful not

to cut away too much integument, or remove several of these tags at the same sitting, lest contraction of the anal orifice result. If a woman be suffering severe pain from a congested and inflamed pile, it should be incised. With the thumb and forefinger it is pinched up, steadied, and a curved bistoury is passed through it. The contained coagulum can be squeezed out. Warm anodyne fomentations and soothing ointments can then be used. Chlorethyl spray is useful in making such an incision, or in cutting off the folds of skin.

To ligature Internal Piles.—Having regulated the patient's bowels for a few days previously, an enema is administered early on the morning of the operation, thorough evacuation of the bowel is secured, and immediately before it the rectum is washed out with a warm solution of boric acid. An anæsthetist, assistant, and nurse are required. The patient is brought well to the edge of the bed or table and placed opposite a good light, in the dorsal position, the thighs well apart and supplied by leg-rests, and a folded sheet and waterproof under the buttocks. When she is fully anæsthetized, the sphincters should be thoroughly dilated, the piles exposed, and the surface of the bowel cleansed. A tampon of iodoform wool or a sponge may be carried some inches up the bowel to prevent any mucus or fæces descending during the operation. On a small table at the side of the operator or assistant should be the instruments.

The nurse has beside her a basin with some carbolized water, convenient-sized sponges or gauze dabs, catch forceps and sponge-holders. An irrigator with pipette is useful for cleansing the bleeding surface, washing away clots, or douching with hot water.

Each pile (commencing with those nearest the anal aperture and on the lower rectal wall) is seized with the fork or pile-forceps, and drawn well down and out from the coat of the intestine. The pile-scissors (Fig. 613) bent on the flat, or the spring scissors, is now laid flat against the rectal tunic, and the blades are made to embrace the sides of the hæmorrhoid, the blunt points of the scissors not quite reaching to the summit of the pile, and leaving its upper connection with the bowel free. With a few strokes of the scissors the division of the tumour is effected. The surgeon, laying down the scissors, transfers the pile-fork to his assistant, and, taking a ligature, carries it well in to the angle of the wound he has made, to the junction of the yet semi-detached pile with the rectal wall. He secures this ligature firmly with a double or triple knot, and cuts

off one end close to the pile. The pile is now completely removed, not too close to the ligature, lest the latter be cut. He proceeds in this manner with each pile. Any spurting vessel he secures by forcipressure or gut ligature. He next inspects the anus, and removes any superfluous folds of skin with the scissors. The part should be sponged with some carbolic lotion, the buttocks are cleansed, a firm T-bandage is applied over the compress of thymol wool, an opiate is given, and the bowels should be kept quiet for at least five or six days after the operation. Then they are first moved by an emollient enema of strained gruel and olive-oil. The rectum may be daily douched with a warm boric acid lotion, and the finger, covered with some antiseptic ointment, is carried into the bowel gently, to lessen any chance of contraction. Ligatures generally come away on the seventh or eighth day. The patient remains in bed until the ligatures separate, and after this she may lie on a sofa for a few days before moving about. This she should not do too soon. Careful instructions should be given regarding the daily evacuation of the bowel, and the use of a little hazeline and boric acid injection after the motion is beneficial. Any swelling about the anus from the cutting off of external hæmorrhoids quickly subsides by attention to cleanliness and the use of an astringent ointment.

W. Whitehead's Operation.—This is an operation of ablation. I have on several occasions adopted the plan he advocates of attaching the sound mucous membrane above the pile area to the skin. I have not, however, followed his method in its entirety, being quite satisfied with my results by ligature. In the case of unusual hæmorrhage I arrest it by deep gut ligatures, carried (after A. Martin's method) deeply through the tissues. I think it far safer to trust to ligature in such cases than to torsion.

The following is Whitehead's operation:—

The patient being secured in the lithotomy position by Clover's crutch, and the sphincters fully dilated, by the use of scissors and dissecting forceps the mucous membrane is divided at its junction with the skin round the entire circumference of the bowel, every irregularity of the skin being carefully followed. The external, and the commencement of the internal, sphincters are then exposed by a rapid dissection, and the mucous membrane and attached hæmorrhoids, thus separated from the submucous bed on which they rested, are pulled bodily down, any undivided points of resistance being nipped across and the hæmorrhoids brought below the margin of the skin.

The mucous membrane above the hæmorrhoids is now divided transversely in successive stages, and the free margin of the severed membrane above is attached as soon as divided to the free margin of the skin below by a suitable number of sutures.* The mucous membrane should be separated at its lowest point, and the dissection carried laterally from below upwards.

Clamp and Cautery.—After the remarks I have made on the 'clamp and cautery' method of removing piles, I do not intend to enter into the details of the operation. The preliminaries are the same as for operation by ligature; the pile is brought down, secured by the clamp, and then it is cut off with the bent scissors (Fig. 613), the cautery being applied at a dull heat.

The late Henry Smith, of King's College Hospital, was a strong advocate for the use of the clamp.

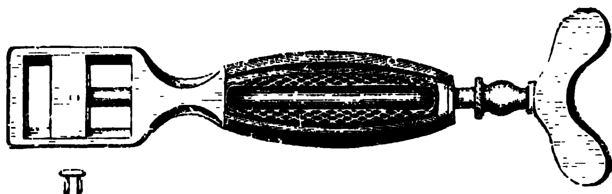


FIG. 616.—POLLOCK'S CLAMP FOR CRUSHING HÆMORRHOIDS.

To Pollock we are indebted for the suggestion to remove piles by crushing. The steps of the operation are as follows: The sphincters are first dilated. The pile is drawn into the clamp, and is crushed by tightly screwing up the bar of steel, and keeping it thus applied to the pile for the space of half a minute. The projecting portion of the pile is removed with scissors. There can be no doubt that crushing is, generally speaking, an expeditious, and comparatively painless method of removing the piles. Still, I maintain that we are not safe, in a certain percentage of cases, from the risk of hæmorrhage, and I repeat that in the case of large hæmorrhoids, and when the patient lives at a distance, the practitioner and patient are more secure with the ligature.

Cystitis after Operation for Piles.—After the operation for hæmorrhoids, the bladder is prone to irritation, and some cystitis occasionally follows. The catheter should, if possible, be avoided, and the patient be encouraged to pass water. If the catheter be required, it must be gently used and perfectly aseptic.

* *Brit. Med. Jour.*, February. 1887.

Treatment by Nitric Acid.—Many surgeons treat piles by the application of nitric acid to the pile. For venous hæmorrhoids of a medium size this plan answers well, and is free from the risks of either clamp or ligature.

To plug the Rectum for Hæmorrhage.—The following method of plugging the rectum, advised by W. Allingham, will be found by far the best: A good-sized conical-shaped sponge is secured by passing a piece of strong silk ligature through its apex. The sponge is then wetted and squeezed dry, and the interstices filled with alum or sulphate of iron. Guided by the fore-finger of the left hand, the conical end of the sponge is pushed well into the rectum for the extent of five inches, and the silk cord hangs from the anus. The space below the sponge is now filled with cotton-wool, on which is sprinkled more of the alum or sulphate of iron. The ends of the string hanging from the anus are now taken in the left hand, and traction is made on the sponge while the cotton-wool is pressed up against it with the finger of the other hand. The effect of the counter-pressure is to spread out 'umbrella-shaped' the sponge, and to compress tightly the wool. This plug may remain in for a period of from eight to ten days. If a patient be troubled with wind, a flexible catheter or rectal tube may be introduced through the wool and sponge or at the side, and this prevents any troublesome flatulence. Opiates at the same time should be given.

Ulceration and Stricture.

Ulceration of the Rectum.- Fissure and ulceration of the rectum are frequently met with in women, both being complicated by such affections of the uterus as endometritis, subinvolution, laceration of the cervix, versions and flexions. Operative interference with rectal disorder is certain to prove unsuccessful as long as the uterine complication remains unrelieved.

Symptoms.– If a woman complain of vesical irritation, with rectal distress and pain, both on defæcation and micturition, and no uterine condition be present to account for these symptoms, the rectum should be carefully examined for fissure or ulcer. It will be well to do this under an anæsthetic if the rectum be sensitive and the patient resist exploration. Nor should we be led astray by the proofs of existing cystitis, as a chronic cystitis is not uncommon in women who suffer from rectal disease.

Treatment.—The treatment of painful ulcer or fissure resolves itself into palliative and radical.

Under the head of palliative we include rest, due attention to, and regulation of, the bowel, the administration of mild laxatives, such as any of those already recommended, to secure an efficient but gentle aperient effect; the use locally, either in lotion, or ointments, of sedative and astringent drugs, as opium, morphia,

cocaine, belladonna, bismuth, calomel, tannic acid, hazeline, perchloride of mercury, and nitrate of silver; in severe cases, the careful application to the ulcer of either the acid nitrate of mercury or nitric acid. The radical treatment consists in operation by incision through *the entire base of the ulcer and fissure, with the division of the fibres and the underlying sphincter.*

The more we reflect on the insidious progress of rectal disease, the obscure, and in many instances remote, symptoms which attend incipient ulceration, stricture, or malignancy, as well as the reflex disturbances which are apt to divert our attention from the rectum to some other organ, the more necessary the injunction to the medical adviser to look to the rectum when such symptoms as those *of dysenteric and morning diarrhœa, jelly-like discharge, colicky pains, and tenesmus are complained of.*

Stricture.—Frequently the ulcer, or commencing stricture, is not close to the anus, but some two, three, or four inches from its margin, so that the examining finger has to be passed well up the bowel before the ulcer or stricture is detected. Women suffer, of the two, more than men from stricture of the rectum. It seems from statistics that constitutional syphilis in women, if it affect the rectum, is particularly liable to cause stricture.

Verneuil's operation of division of the entire stricture, or linear rectotomy, is that most frequently practised. In dilatation of a stricture, soft, bulbous-pointed, hollow bougies may be used; the surgeon should have some of these of different sizes by him; and it is by far the safest plan for him to dilate the stricture rather than permit the patient to pass the bougie herself. The larger sizes of my uterine bougies will be found to answer well for the surgeon's use. They must be employed with gentleness.

I may here say that muscular 'spasmodic stricture of the rectum' is a very doubtful affection; moreover, I believe that in many of these cases of 'spasm' we have simply to deal with a neurotic reflex irritation (that there is no real stricture to necessitate dilatation is at once proved by an anæsthetic) which causes a tonic contraction of the sphincters, generally exaggerated by the presence of hard, dry, and impacted fæces.

Malignant Disease.

The most prominent symptoms of malignant disease are: pain on and after defæcation; the presence of blood, both in the stools and

when they are passed. Sometimes there is a semi-watery discharge, with a peculiarly heavy and fœtid odour. On examination there is a characteristic hard feeling, the extent of the roughness, or the 'broken-down' sensation, being dependent upon the nature, duration, and extent of the disease. The most important feature of this terrible affection for the young surgeon to keep before him is the very insidious nature of its onset, and the comparatively trivial symptoms which may accompany the first stages of the disease.

The prolongation of life, or relief of symptoms, will depend on the extent, number of adhesions (to vagina or uterus), and situation of the disease. Life may be prolonged by extirpation of the rectum, or colotomy.

Pain may be mitigated by opiates given internally, and other sedatives; the administration of morphia subcutaneously; opiate injections into the bowel; morphia suppositories; and the unpleasant odour controlled by the free use of disinfectants and antiseptics. A thymol injection helps to conceal it. I have found some benefit result from the administration of Chian turpentine.

Pruritus Ani.

Pruritus ani may be treated on the same principles as those followed in the management of pruritus vulvæ. As in this latter troublesome affection, pruritus ani has its origin in constitutional as well as local causes. All that has been said of the vulvar affection applies to that of the anus. Here, however, we have to remember that hæmorrhoids, fissure, polypus, thread-worms, vaginal discharges, or syphilitic skin eruptions, may produce the itching, and that these must be cured before we can hope to relieve it. All superfluous tags of loose skin should be cut off. Scrupulous cleansing of the part night and morning should be enforced. A hypnotic may have to be given, such as trional or sulphonal, to secure sleep, and a rectal plug worn at night is useful. By following the same rules as have been laid down in pruritus vulvæ, while attending by local measures to the anus and rectum, and not neglecting errors of a constitutional character, we seldom fail to bring about a speedy cure.

Procidentia.

It is well to remember that procidentia of the rectum is at times associated with polypus; and the practitioner should be careful not

to mistake it for hæmorrhoids. Procidentia occurs perhaps more frequently in women than in men, and often increases to a large size. The plan of Van Bruen will be found most efficacious. Longitudinal strips are made in the protruded intestine with a Paquelin's cautery, avoiding the large veins, and then the operator returns the intestine, having first *oiled it well.* After return of the bowel, he secures further contraction of the anal aperture by division of the sphincter with the Paquelin's knife in two places, and stuffs the wounds with oiled wool. Longitudinal and circumferential contraction is the result.

If a *polypus* be discovered in the rectum, torsion or ligature will be sufficient to remove it without danger.

Rectocele has been already referred to (see pp. 294, 295).

A Few General Therapeutic Hints.

Soothing Measures.—Great relief from rectal pain, from proctitis, or inflammatory hæmorrhoids, or threatening abscess, is often secured by the application of leeches round the anus. A warm toast poultice is a ready and grateful form of stupe to apply when the leeches are removed after incision of a pile. A piece of thick toast is made, on which boiling water is poured. The toast is squeezed between two plates, so as to press out the water, supported on a handkerchief, or covered with a piece of oiled silk; it is laid over the perineum, and is maintained in position by a T-bandage. A piece of spongio piline may be used for the application of sedatives to the anus. It is a clean and ready means of relieving pain. The warm sitz-bath is often very comforting to a patient, or the steam of laudanum-water placed in the night chair on which she sits. Suppositories of cocaine, or cocaine and belladonna, and cocaine with morphia, are valuable as local sedatives. Hazeline is an admirable astringent remedy, both when given internally and applied externally for hæmorrhoids. Both the glycerols of tannin and of lead are useful external applications for fissure and hæmorrhoids. Goulard's lotion, in combination with the liquid extract of opium, is a capital sedative in hæmorrhoidal congestion and in ulceration.

Aperients.—In the instance of women suffering from external hæmorrhoids, the diet should be carefully regulated, and scrupulous cleanliness insisted on after stool; mild laxative medicines should be used, and such cholagogues as podophyllin, iridin, euonymin, with small doses of mercurial pill or hydrarg. cum creta. An

aperient water such as Rubinat, Æsculap, or Hunyadi Janos may be given. The compound powder of liquorice is also a useful aperient for women. Also this mixture:

℞ Ext. cascara liq. ℥i.
Glycerine ʒi.
Aq. ad ℥viii.

The elixir of saccharin (ʒi.) well takes the place of glycerine. ℥ss. to be taken every morning early or at bed-time.

Cascara bonbons or tabloids are efficient modes of administering cascara.

Such a pill as the following will generally be found to act efficiently:

℞ Pulv. iridin } āā gr. ¾.
Pulv. euonymin }
Hyd. cum cret., gr. i.
Ext. col. co., gr. i.ss.
Ipecacuanhæ } āā gr. ss.
Ext. hyoscyami }
Ft. pil.

Or, ℞ Pulv. euonymin, gr. i.
Pil. hydrarg., gr. i.
Pil. rhei comp., gr. ii.
Ext. nucis vom., gr. ss.
Ext. hyoscyami, gr. ss.
Ft. pil.

Or, ℞ Ext. belladonnæ, gr. ¼.
Ext. nucis vom., gr. ¼.
Phil. col. co., gr. iii.
Ext. hyoscyami, gr. ss.
Ft. pil. M.

The confections of sulphur, senna, and black pepper are useful laxatives, especially the latter. A good form is:

℞ Tartr. potassæ acid., ʒii.
Pulv. jalapæ, ʒi.
Confect. sulphuris, ℥i.
" sennæ, ʒi.ss.
" piperis nigræ, ʒss.
Mel. opt. ad ℥iv. M.
Ft. confectio; ʒi. to be given as a dose.

The glycerine enema (ʒi. of glycerine administered with the glycerine rectal syringe) is in some cases an efficient means of emptying the rectum. Its action is, however, capricious, and is occasionally attended by severe pain. The suppository of glycerine may be tried instead of the enema.

Calomel ointment, with bismuth and belladonna; liq. plumbi subacetatis; ointment of bismuth with glycerol of lead; ointment of tannic acid, with bismuth and opium, will be found soothing applications.

In cases of ulceration of the rectum, or fissure, ointments of bismuth (℥ss. of carbonate in ℥ii.), calomel (ʒii. in ℥ii.), morphia, (gr. iii. ad gr. v. ad ℥ii.), belladonna (gr. xxx. in ℥ii.), pulv. opii (gr. xx. in ℥i.), may be used separately or in combination. For example, a most useful ointment is:

Bismuthi trisnitratis, ʒii.
Hydrarg. subchlor., ʒii.
Ext. belladonnæ, gr. xxx.
Ext. opii liq., ʒii.
Lanolin, ʒss.
Aq. rosæ, ʒi.
Adeps benzoatis, ʒss. M.

For application with the rectal positor the following will be found of service: Cocaine, both in the form of ointment and lotion for the relief of pain. Eucaine may be substituted for the cocaine. Iodoform can be applied as an ointment, internally, to the bowel, or dusted externally in fine powder diluted with starch (gr. x. to gr. xxx.

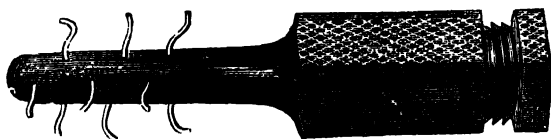


FIG. 617.—OINTMENT POSITOR.

ad ℥ii.); calomel or bismuth ointments, in combination with belladonna, opium, and tannic acid, are useful ointments for internal hæmorrhoids. In syphilitic cases iodoform ointment, or ointment of perchloride of mercury (gr. ii. to gr. v. ad ℥i.), is most useful. The odour of the iodoform may be disguised with vanilline or coumarine.

To apply an ointment to the rectum, an ointment positor is required, as otherwise it is wiped off the surface of the finger before it reaches the part. I have had a convenient positor made. The ointment is contained in a tinfoil case, and the pipe is of soft gum-elastic.

Astringents.—Tannic acid, gallic acid, acetate of lead in ointments; injections of matico and oak-bark; solutions of carbolic acid, chromic acid, nitrate of silver. Perhaps the best local astringent in cases of rectal hæmorrhage is the sulphate of iron, which may be used either in the form of ointment (ʒii. ad ℥ss.), suppository (gr. ii. ad gr. x.), or as the liquor ferri sulph., diluted according to the strength required.

Caustics.—The acids, nitric, carbolic, and chromic, and the acid nitrate of mercury, are the most powerful caustics we can apply both to ulcers or bleeding mucous surfaces; of these the acid nitrate of mercury is probably the best. The surface to be touched should be carefully exposed, and the acid applied with cotton-wool on a platinum or aluminium wool-holder. The part is well oiled after

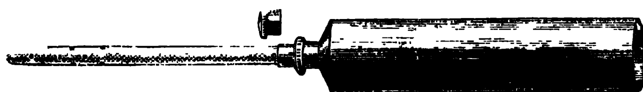


FIG. 618.—RECTAL POSITOR OF AUTHOR. (Mayer and Meltzer.)

the application. For all cases where the actual cautery is required, Paquelin's instrument is the best.

Coccygodynia.—By coccygodynia we understand a painful affection of the coccyx and perinæal structures, which principally shows itself in painful sitting, and pain in the act of defæcation. The structures involved are: the coccyx, the sacro-coccygeal ligaments, and the perinæal muscles attached to the coccyx.

Causation.

Traumatic { Blows, kicks, or falls on the coccyx.
Difficult parturition.
Instrumental delivery. }

Horse-exercise (Scanzoni, Goodell).
Constant sitting.
Hysterical temperament.
Rheumatism.
Uterine and ovarian disease.
Rectal disease.

I have, however, seen severe coccygodynia present in an unmarried woman in whom not one of the causes enumerated above could be traced.

I had attended her some time previously for a severe attack of erysipelas of the face. From this she perfectly recovered. There was no rectal, uterine, or other local trouble. She was not, in the least, of an hysterical or nervous temperament. She had no sedentary occupation, nor was she in the habit of taking horse-exercise. At first her sister consulted me, telling me that the patient thought she suffered from internal piles, and was averse to seeking advice, but that the difficulty in sitting had become so great she could not come to meals. The pain had come on gradually. The discomfort

produced by examination of the rectum or any pressure on the coccyx was inconsiderable, and yet she could not sit without great suffering. In this case relief was afforded by sitz-baths, counter-irritation over the coccyx, anodyne liniments, and suppositories, a rectal plug, which was worn at night, and the internal administration of bromide of potassium with nux vomica.

In a few cases under my care, coccygodynia has been the most troublesome symptom complained of prior to mental disturbance showing itself. In one instance there was an attempt at suicide, the patient attempting to drown herself.

On examination by the rectum and vagina, the coccyx, if dislocated or fractured, is felt quite movable or loose.

Treatment.—As a rule, severe coccygodynia require operative measures, but first such nerve tonics as arsenic, strychnine, sulphate of zinc, pyrophosphate of iron, and other salts of iron, if there be anæmia, should be tried. The valerianate of zinc and the ammoniated valerian in combination with the bromide salts are useful. The painful region may be sprayed with ether night and morning. The application of the actual cautery often benefits. Change of air and scene, suitable exercise, and other general hygienic measures, should accompany any treatment. If palliative treatment should not cure the patient, the subcutaneous division of the coccygeal ligamentous and muscular attachments may be proposed (Sir J. Simpson), or extirpation of the bone itself can be carried out (Nott). In deciding on any radical step, such as subcutaneous section or removal, we are influenced chiefly by the decision as to the traumatic character of the affection. It is in those cases of partial dislocation or other injury of the bone that extirpation is especially indicated. The important practical rule to adopt in any case in which we are consulted for 'painful sitting' or symptoms of coccygodynia is *to carefully exclude any uterine, vaginal, perineal, or anal affection* which might account for the pain, and the removal of which will often relieve all the distressing symptoms.

Operation.—This is an operation which should be done aseptically. An incision is carried over the bone in the middle line. With a blunt-pointed knife the bone is severed from all its attachments The edge of the knife is kept close to the bone. Then the bone is disarticulated and ablated. The wound is brought together with silver or gut sutures, and covered with boric lint under strapping and a T-bandage. It is as well to keep the rectum quiet for a few days.

CHAPTER XLV.

STERILITY.

IN a manual such as this it is not possible to discuss at length all the causes which result in sterility. No one has investigated these causes in the woman with greater minuteness than the late Marion Sims. Again and again he has examined the mucus of the cervix uteri a few minutes after intercourse to determine the presence or state of the spermatozoa contained in it, or the quantity of seminal fluid retained in the vagina. He, first, succeeded in impregnating the woman by the injection of semen into the uterus, though the patient unfortunately miscarried at the fourth month from a fall. During two years he made as many as fifty-five uterine injections of seminal fluid. We may thus summarize the most importants facts in relation to sterility--*

1. In order for conception to take place it is not absolutely necessary for penetration to occur. (See pp. 8–10, on the Hymen.)

2. The spermatozoa will travel a considerable distance and live for several hours in a suitable medium and at a proper temperature.

3. It is necessary that the seminal fluid should contain healthy active spermatozoa, that it should be retained in the vaginal canal, and, if possible, that ejaculation should occur in the axis of the cervix and of its opening.

4. If healthful semen be deposited in the vagina within a few days before, and within ten days after, a menstrual act, conception is more likely to occur.

To complete these conditions, we require a sufficiently long vagina with due tonicity of its walls, and the uterus as nearly as possible in its normal axis; the uterine and vaginal secretions

* Artificial fecundation is not resorted to, so far as I know, by any gynæcologist of position in Great Britain. One writer, within recent years, has tabulated the conditions in which such intra-uterine injections of seminal fluid are indicated (Mantegazza).

healthful, and contact, at the right time, of the ovum with the spermatozoa.

We may thus classify the principal causes of sterility *—

Congenital ...

1. Absence of the ovaries.
   „ „ Fallopian tubes.
   „ „ uterus.
   „ „ vagina.
   Very short vagina.
2. Atresia of the Fallopian tubes.
   „ „ uterus.
   „ „ vagina.
3. Imperforate hymen.
4. Conoidal uterus, stenosis and occlusion of the os uteri or cervix.

Acquired ...

1. Strictured states of the Fallopian tubes.
   „ „ uterus.
   „ „ vagina.
2. Tumours obstructing the Fallopian tubes.
   „ „ uterus.
   „ „ vagina.
   „ „ vulva.
3. Displacements of the Fallopian tubes.
   „ „ uterus.
4. Inflammatory states of the genital tract—especially chronic endometritis.
5. Chronic metritis.
6. Disease of the ovaries.
7. Ovarian dysmenorrhœa.
8. Membranous dysmenorrhœa.
9. Menorrhagia.
10. Dyspareunia—painful intercourse from any cause.
11. Vaginitis and vaginismus.
12. Gonorrhœa and its consequences.
13. Syphilis (in the sense that it destroys the vitality of the ovum).

The reader will refer to the chapters in which each of the above-mentioned causes of sterility in the woman is discussed.

* See especially the chapters bearing on dysmenorrhœa, dilatation of the cervix, stenosis of the cervix, congenital malformations, gonorrhœa, and vaginismus. It is very doubtful how far, in a woman capable of procreation, mere contraction of the lumen of the uterine canal is to be regarded as a cause of sterility—probably very seldom.

Sterility not due to Defect in the Female Generative Organs.

The possibility of the cause of the sterility resting with the husband, and not with the woman, has to be remembered. The fact that many women who are barren with one husband are fertile with another is not to be overlooked.

Sterility in the male depends on more than want of a healthy erection. The seminal fluid must contain virile spermatozoa. Therefore a man may not be impotent and yet be sterile. Strong sexual desire and power may thus be, as Curling has shown, co-existent with sterility, and, through the absence of conception, may be the cause of serious affections of the sexual organs in women. Thus a clear distinction has to be kept in mind between the terms "sterility" and "impotence." Those inhibitory forces which overcome the reflex excitation in the sexual centre, and thus inhibit the normal process of erection in the male, must be remembered in the treatment of male impotence. It is a matter of common observation that the cerebral impulses are blunted or arrested by excessive mental strain, and are held in check by healthful and continuous brain work. This relation of cerebral control to erection and seminal discharge is shown physiologically in the case of spinal injuries, cerebral concussion, and the seminal emissions which result from hanging. Cerebral inhibitory control is lost.

Clearly, then, the virile powers and health of the husband have to be inquired into when we are consulted by a woman on account of her sterility. It must also be remembered that the general health in both the woman and the man has a potent influence on fecundity.

Gross has estimated that one male in every six is sterile. This is probably too high an estimate. It is certainly much higher than the estimated sterility of women. There may be *incompatibility* of the sexes, and sterility as a result, though neither the man nor woman is sterile, for either separately may be fertile to another person and procreate.

Certain points have to be carefully inquired into of the husband—

(1) Are there healthy erections? (2) Are there nocturnal emissions? (3) Is semen ejaculated during intercourse? (4) Does emission occur prematurely, or is there incomplete coitus? (5) Is there sensation? (6) Is there pain in the penis with intercourse? (7) Is there any affection of the prostatic urethra or prostate gland? (8) Does he masturbate? (9) Is there stricture of the urethra in any part? (10) Is the foreskin tight in erection?

It may be well to summarize the causes of sterility and impotence in the male.

Impotence.- Gross subdivides the causes of *impotence* under the four heads: *Atonic, Psychical, Symptomatic, Organic.* We may further briefly classify (following this authority) the causes of impotence thus—

Atonic	Muscular paresis both in the walls of the vessels and in the muscular trabeculæ and the perinæal muscles, brought about by Masturbation or Venereal excess — causing exhaustion of the lumbar centre. Sexual desire present — Ineffectual erection and ejaculation. Premature emission. Incomplete intercourse. Sexual desire absent—Loss of erectile power.
Symptomatic	Loss of sexual power from a prolonged or excessive use of bromide salts, iodine and iodide salts, camphor, conium, opium, morphia (in lead-poisoning), alcoholism, antimony fumes.

Sterility.

Azoaspermia —absence of spermatozoa	The fault may be due to absent, retained, undeveloped, diseased testicles; obstruction in the epididymis and vas deferens, or injury to the latter during operations; disease of the same parts, possibly due to past gonorrhœa or syphilis. Organic obstruction ejaculatory ducts or urethra.
Aspermia — want of ejaculation of semen during coitus	Atonic—want of excitability in the ejaculatory centre. Anæsthetic—loss of sensibility in the nerves of the penis. Psychical—cerebral inhibition.
Organic-obstructive	Absence of the penis or other abnormalities, including hypospadias and epispadias; curvature of the penis, the result either of congenital defects, wounds, or growths in one or both of the corpora cavernosa, varix of the dorsal vein, tight prepuce, short frænum, retained testes. atrophic testicles produced by any cause, syphilitic and tubercular orchitis. May be due to congenital defects, stricture in the ejaculatory ducts and urethra, stenosis in the ejaculatory ducts, spasm of the urethra.
Atonic	Want of contractile power in the seminal vesicles, ejaculatory ducts, urethral muscles; incomplete coitus results—the act is abandoned from loss of strength.

Anæsthetic	Insensibility in glans, prostatic sinus, or prostatic urethra.
Symptomatic ...	During phthisis, Bright's disease, spinal curvature, degeneration of the cord, spinal injuries, after the zymotic fevers.
Psychical	This head includes any variety of mental deterrent influence, such as nervous apprehension, remorse, physical repulsion, want of affinity, and other purely psychical causes. This class includes generally all those imaginative victims of advertising quacks. There may be inhibitory restraint voluntarily exercised during coitus.

The reader will find an admirable summary of the entire subject in Mr. Jacobson's classical work on 'Diseases of the Male Organs of Generation' (Churchill, 1893).

Many cases are curable by proper treatment and judicious advice to both the husband and wife. At times every effort to bring about the desired result fails. Such cases must, however, constantly come before the gynæcologist, for there is no doubt that, in addition to the unhappiness caused, they are the frequent sources of morbid states of the uterus and adnexa. Hyperæsthesia of the vulva, vaginitis, erosion of the cervix uteri, ovaritis, or salpingitis, are their not uncommon accompaniments.

A lady, now thirty-two years of age, conceived under these circumstances. She consulted me in July, 1891. She had been then married for five years. There had been no intercourse for a considerable time after marriage. The husband suffered from atonic and psychical aspermia. Of this he was, after some difficulty, cured by the late Hack Tuke, to whom I was indebted for the case. The wife suffered from dysmenorrhœa. On examination I found a typical conical-shaped cervix and a minute uterine orifice. She had the internal cervix divided. The canal was with difficulty kept patent. She went through a course of internal faradization for the dysmenorrhœa. Of this she was cured. But conception did not occur for a length of time, though the canal of the uterus remained permanently dilated. She now has a child. This is a good example of the source of sterility being traceable to both male and female sexual defects. It is also a proof of the advantage of protracted treatment judiciously applied in both instances.

I am aware of another case in which no healthful intercourse occurred for over five years, though the husband had pleasurable healthy emission. There is now a family.

One caution I think it well to give the young practitioner. I would say to him: 'Do not be led away by the miraculous cures of sterility you hear of, or the occasional success you may yourself

meet with in rectifying some obstruction to impregnation, to hurriedly perform operations on the uterus with a view of 'curing sterility.' Bear in mind, in the first place, that failure will attend a large proportion of such operations. The patient should be frankly prepared for this. Remember, also, that these uterine operations are not devoid of risk, and that barrenness has all its evils aggravated, when the miserable hypochondriac passes from hand to hand, the victim of delusive hopes and disappointing operations. Far otherwise is it when some diseased or abnormal condition of the uterus exists which it is our duty to treat by operation, and the cure of which may bring about a possibility of impregnation. Nor do I mean to deprecate any justifiable and judicious interference with an otherwise healthful woman who happens to be barren, in order to bring about conception; but that the surgeon incurs a grave responsibility who operates on a woman otherwise in perfect health, as many barren women are, if there follow either directly from the operation, or indirectly from the results, dangerous or permanently serious consequences, even though she and her husband may accept any risk entailed.

Congenital Absence of Uterus and Adnexa and Rudimentary Mammary Glands.

It has to be remembered that the female external organs may be perfect, yet there may be congenital absence of the ovaries and oviducts as well as the uterus. Such a case I lately saw. The patient was twenty-two years old. She had never menstruated, and had tried various remedies from time to time for the absence of the catamenia. She had never been examined by the vagina. The uterus was absent, a small body about the size of a marble representing it. There were no adnexa. Rudimentary nipples were present, and only the vestige of mammary glands.

CHAPTER XLVI.

GYNÆCOLOGICAL ELECTRO-THERAPEUTICS.

It is right to remember that Cutter, of America, long since practised, and urged the value of, the electrical treatment in various uterine affections. Apostoli acknowledges his indebtedness to A. Tripier, who 'devoted thirty years in a glorious scientific struggle to seek a panacea for metritis in the induced current of quantity.' As far back as 1873 Routh and Althaus used continuous currents of high intensity in the treatment of uterine fibroids. To Apostoli is due the credit, as he himself puts it, of supplanting the old way of operating by a method more 'precise,' 'energetic,' 'tolerable,' 'better localized,' 'more thoroughly under control,' and 'scientifically exact.'

Obviously a previous, at least elementary, knowledge of the laws of electrical forces must be assumed, and some acquaintance with the modes of action, physical, chemical, and therapeutical, of the different kinds of electricity on the human body is essential before resorting to this method of treatment.

It may be truthfully stated that the galvano-caustic method of treatment of myomata of the uterus, or tumours of the adnexa, has taken no great hold in this country, nor, indeed, abroad. The same may be said of the method of galvano-puncture, either in vaginal fluctuating tumours, or in myomata of the uterus. The uncertainty of the results, the technical difficulties connected with their safe and efficient performance, the acknowledged risks attendant upon them, have all contributed to influence the minds of surgeons unfavourably with regard to these electrical methods generally, as compared with the more certain, safer, more expeditious, and successful operative measures by means of the ordinary surgical procedures. There can be no doubt that in many cases faradization does give relief in dysmenorrhœa, subinvolution, and painful affections of the ovary. As the most perfect instructions for the carrying out of faradization are those of Apostoli, I

briefly summarize here the directions which he gives for the application of the faradic current.

With regard to the galvano-caustic treatment, I cannot go into minute details of Apostoli's methods. I have done so in previous editions of this work. No one should resort to them who has not mastered their details and taken all the precautions, before, during, and after operation, enforced by Apostoli himself. These include careful preliminary examination, attention to the temperament of the patient—if neurotic or hysterical (contra-indicating conditions), the most exhaustive inquiry into the previous clinical history of the woman, and any associated pathological states, the minutest care as to the place and its surroundings in which the treatment is carried out, the time of the menstrual epoch, abstinence from cohabitation, the most complete asepsis. If it be true that the most experienced of us are liable to err, that our greatest gynæcologists have placed on record errors both avoidable and unavoidable, and that Apostoli himself tells of his 'not recognizing a suppurating ovarian cyst which ended in death from peritonitis,' how careful must the young surgeon be to make assurance doubly sure before he resorts to electrolysis, and decides on the extent to which he will avail himself of it, or the exact mode in which he will apply it.

None who carefully read Apostoli's review of his own work, of his acknowledgment of 'blunders' made in carrying out the treatment, of the cautions he gives as to exactitude of dose, antiseptic precautions, and all the other details of operations, the performance of which demands that the operator be 'both gynæcologist and electrician,' will refuse to admit that the risks to the patient are in inverse ratio to the experience of the operator. Therefore does it behove every one to err on the side of excess of caution, to surround his patient with every possible safeguard both before, during, and after operation, in careful antisepsis, in regulating the strength, character, and extent of the electric application, as well as the length of time it is applied, and in estimating the tolerance of the patient and her special susceptibilities to electrical influences. Something else of still greater importance is demanded of the operator, without securing which all these safeguards may be valueless, namely, an accurate diagnosis. I have had in one case of my own clear evidence that, even when surrounded with every precaution conceivable, this method of treatment is not devoid of danger, and that death may occur, whether due directly to the operative procedure itself, or indirectly to it and other unfavourable circumstances in the patient.

In the instance I refer to, the patient was a woman of a nervous temperament, manifested at times by attacks of a hystero-cataleptic nature. These nervous attacks were precipitated by violent uterine hæmorrhages, and were attended with the most severe flatulent eructations I have ever heard. Great success with any operative procedure, even in hands the most endowed by nature with manipulative dexterity, and guided by the clearest intellect, can only be attained with an experience in which some failures or blunders have taught the lessons which have ensured the ultimate approach to perfection. As characteristic of the different opinions on the value of the method of Apostoli we may quote the following views of Rokitansky, A. Martin, and Mackenrodt:

Rokitansky in Vienna * reported results of cases treated during two and a half years. There were twenty-two fibromata of the uterus, one of perimetric exudation, and eighteen cases of the various forms of chronic endometritis. The total number of sittings amounted to about 650. The greatest number of sittings that any one patient was subjected to was sixty-three. Their duration varied between five and ten minutes (in two cases twelve minutes). The intensity of the current seldom exceeded 100 to 110 (once it reached 300) milliampères. This plan of treatment, he says, is occasionally valuable, but even when used correctly and with care it has its dangers, is painful, slow, and does not always produce the desired results, and is often only a palliative measure.

A. Martin and Mackenrodt † treated sixty-six cases of uterine myomata. In the first group (55·5 per cent.), for the most part with small tumours, the results were favourable, in so far as hæmorrhage and pain were lessened and the general condition was improved. On the other hand—

1. There was no case in which the tumour disappeared;

2. Nor was the size of the tumours diminished, beyond all doubt.

3. In twenty of the thirty-six cases the menopause occurred during the treatment, with regressive changes in the tumours.

4. In twelve the improvement was not entirely permanent.

5. In 44·5 per cent. there was no improvement at all; the condition of the patients grew worse, and three cases, 8·3 per cent., died during treatment.

On the ground of their experience and that of others, the above authors reject the Apostoli treatment of myomata.

Analyzing some statistics of Keith and Schäffer, they found that of 212 cases, in 32 per cent. the symptoms were relieved; in 44 per cent. they became worse, and nine patients (4·3 per cent.) died. In no instance did the tumour disappear. Moreover, the so-called 'symptomatic cure' was only permanent when the patient was near the menopause at the time of the treatment; before this period the hæmorrhage frequently recurs.

Granting that electricity is a palliative means of treating fibroids, it remains

* *Wiener-klin. Wochenschrift*, 1890, Nos. 47 and 48.

† *Deutsche Medicinische Wochenschrift*, No. 2, 1892.

to inquire why the results are so variable. The explanation is to be found in the histological peculiarities of the tumours in different cases. Thus, among 356 cases treated by Martin in his private hospital, in fifty-three the tumour was cystic or malignant; in twenty-three there was accompanying disease of the uterus (cancer or pregnancy); in forty-three marked disease of the adnexa. Since most of these complications could not be recognized before the abdomen was opened, it was evident that there was some risk in the electrical treatment. As regards the extirpation of the myomatous uterus, the writers report twenty cases of laparo-hysterectomy with two deaths (neither from sepsis), and fourteen cases of vaginal extirpation, with no deaths. Including five successful cases of enucleation, the entire mortality is 5 per cent., as compared with 4 per cent. with the electrical treatment. Considering the difficulty, loss of time, and discomfort to the patients attending the latter, and the fact that in more than a third of the cases they became worse, these authorities have entirely abandoned it. Fibroid tumours which give rise to only slight symptoms receive no local treatment at all. If serious disturbances be present, the patients are operated upon.

Indications for Faradization (Apostoli).

Low-tension current (primary helix and thick wire bobbin).

Arrested involution and secondary post-partum hæmorrhage.
Subinvolution.
The acute stages of perimetritis and ovaritis.
Chronic metritis.
Menorrhagia.
Amenorrhœa.*
Dysmenorrhœa.*

High-tension current (thin and long wire bobbin).

Vaginismus.
Oöphoralgia.

If a current of quantity be required, as in cases of amenorrhœa or hæmorrhage arising from arrested involution, the thick wire bobbin is used. If, on the other hand, the current of tension be indicated, as in the pain of oöphoralgia, dysmenorrhœa, and in salpingo-ovaritis, the thin and long wire bobbin is used

1. Commence with the simple vaginal application, using a long bipolar electrode.

2. Let the current be *very mild* in the first application. Avoid the infliction of any shock, and be most careful of any sudden jerking motion of the bobbin.

* These indications are those laid down by Apostoli. The author does not assume any responsibility in quoting them.

3. Carefully judge by the countenance and expression; by questioning the patient of her tolerance of the current.

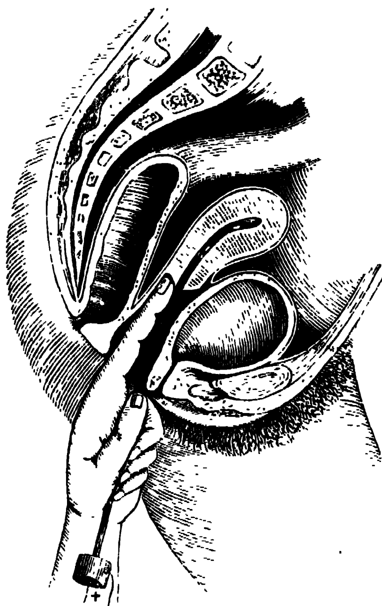


FIG. 619.—SHOWING THE ELECTRODE IN THE UTERINE CAVITY. (Bigelow)

4. Apply the 'vaginismus' electrode to the most painful spot in the vaginal roof, and the 'concentric carbon' uterine electrode to the cervix uteri.

5. After a few such sittings (if indicated) apply one of the bipolar intra-uterine sounds, with the same extreme care to avoid the infliction of shock, and only such pain as is easily borne by the patient.

6. One sitting daily will, as a rule, be sufficient. This should last from five to twenty minutes, its length being regulated by the effect produced.

7. The bipolar sound should not be introduced into the uterus during the progress of any acute inflammatory affection of the uterus, ovary, or Fallopian tube.

APPLIANCES REQUIRED FOR FARADIC TREATMENT.

Battery.—A battery is required which shall yield both low and high tension currents, capable of being increased without any sudden jerks, so as to avoid the infliction of shocks. For this purpose the sledge-coil is the best. High-tension bobbins of very thin wire slide over the low-tension bobbins of thick wire.

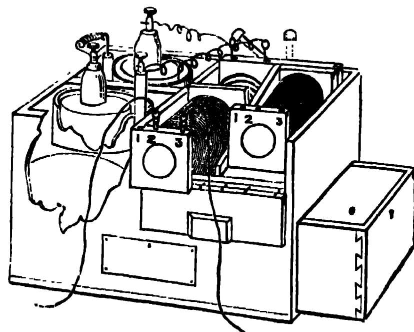


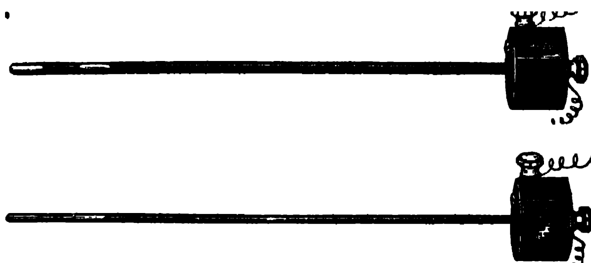
FIG. 620.—FARADIC CURRENT BATTERY.

Such a battery as that shown at Fig. 620 (Coxeter) will be found to answer the purpose admirably. There are two bobbins of different thickness of wire, and thus a current of medium or high tension can be obtained. The terminals needed are:

Bipolar intra-uterine excitors (two sizes).

A concentric bipolar electrode, for application to the uterus.

A bipolar vaginal electrode. The insulating substance is placed horizontally between the metal terminals, these latter being at some distance from each other.



FIGS. 621, 622 BIPOLAR INTRA-UTERINE EXCITOR, OF TWO SIZES.



FIG. 623.—CONCENTRIC BIPOLAR.



FIG. 624.—BIPOLAR VAGINAL.



FIG. 625.—BIPOLAR VAGINAL.

A bipolar (vaginismus) vaginal electrode. The insulating substance dividing the electrode into two is very thin, and is placed vertically, and the poles are thus carried to the end of the electrode, so that it can be applied to any painful, sensitive, or neuralgic spot All these terminals are insulated, so as to avoid any accidental shock to the administrator.

Galvano-caustic Method.

The appliances required for the galvano-caustic treatment and the galvanic cautery are:

A sulphate of mercury battery, twenty-four cells, with double collector, by means of which each cell can be tested separately. This battery remains in action so long as the fluid is kept in contact with the elements.

Gas carbon Sounds of Apostoli.

The object of these sounds is to enable the operator to gradually increase

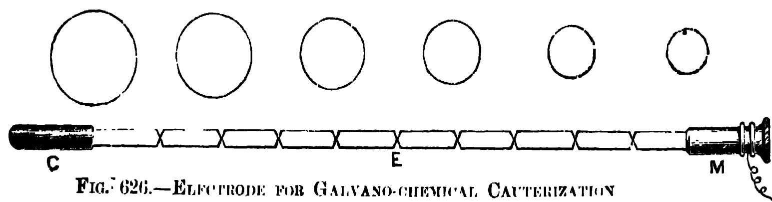


FIG. 626.—ELECTRODE FOR GALVANO-CHEMICAL CAUTERIZATION (one-third actual size).

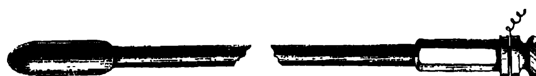


FIG. 627.—GAS-CARBON ELECTRODE.

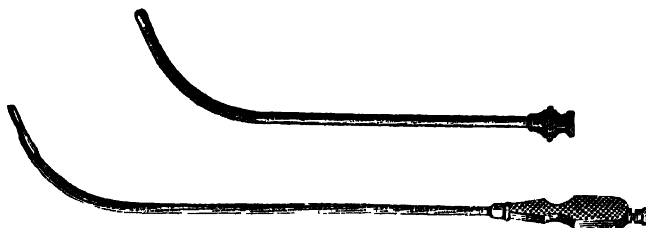


FIG. 628.—PLATINUM-ENDED SOUNDS WITH FLEXIBLE STEMS.

the size of the gas-carbon terminals, so as to arrive at a perfect co-aptation of the electrode to the uterine cavity. The electrode consists of:

(M) Handle for attachment of rheophore.

(E) Caoutchouc covering of the metallic stem, which is marked by circular grooves at regular distances of 2½ centimètres.

(C) Gas-carbon terminal 2½ centimètres long. This, being attached by a screw to the end of the metallic stem, may be replaced by others of different diameters. These progressively increasing diameters are shown by the circles.

Apostoli's Abdominal Electrode of Clay.

Amand Routh devised a flat tray, into the upper part of which a plate-electrode is fixed. The clay is placed in this tray, and if it be kept in a

shallow basin of salt water the electrode is always ready for use, and the mess caused by the clay is avoided.

Inglis Parsons uses copper and lead plates with an insulator which surrounds the edges: about six layers of linen, damped with water, are placed between the plates and the skin. The patient can hold the electrode in position herself.

There are also required a Gaiffe's galvanometer, a water rheostat, the former to measure the strength of the current, and the latter to equalize and regulate it.



FIG. 629. -RIGID PLATINUM SOUND.

Apostoli claimed for galvano-chemical cauterization that it gave relief in the following conditions :—

GALVANIZATION.

Galvano-chemical cauterization in—

Fibroid of the uterus—polypi.
Hypertrophy of the uterus.
Sub-involution.
Acute and chronic metritis endometritis.
Ulceration of the neck of the uterus.
Peri-uterine inflammation (parametritis, perimetritis, phlegmon).
Oöphoralgia.
Ovaritis and periovaritis.
Salpingitis.
Ovarian and tubular cysts at an early stage.
Atresia.
Hæmatocele.
Malignant disease (Byrne).

He insisted strongly on these precautions. Most careful preliminary testing of the battery; avoidance of shock or jerk by a progressive increase of the dose, close attention to the regulating rheostat and galvanometer, careful adjustment of the intra-uterine insulated sound, according to the size of the uterus, proper application of the abdominal electrode to a healthy skin, avoidance of all force with the sound, and thorough protection of the vagina. He divides the operation itself into three stages. The first embraces the passage of the sound, the close attention to the galvanometer, and

the countenance of the patient, the avoidance of the infliction of pain.

We should commence slowly, very slowly, to turn on the cells, especially if it be the first operation undertaken, or if we should not be acquainted with the patient; at first we go to 20 or 30 milliampères. Then proceed to 50: by this time we gain the confidence of the patient, who will soon find out that the electricity does not cause much pain. Then reach 70, 80, or 100 milliampères, and it is better at this first sitting not to go beyond this figure. IT IS IMPORTANT NEVER TO MAKE THE PATIENT SUFFER TOO MUCH, AND NEVER TO INFLICT MORE PAIN THAN IS BEARABLE. THIS IS THE TRUE CRITERION WHICH SHOULD FIX THE LIMIT OF THE DOSE. It will, of course, vary with each patient and each disease, but the success of the operation depends on adhering to this rule. That is why we should apply the current at the beginning slowly and progressively in fractional doses, and then be guided by the replies of the patient in order to gauge what she is capable of supporting.

The second stage lasts for about five minutes, but may extend to eight or ten, never so long in nervous and hysterical women. The steadiness of the needle shows the continuous character of the circulating current. The third stage consists of the gradual stoppage of the current, and the slow withdrawal of the sound.

The after treatment is most important. All movement should be prohibited. The patient should lie down at full length during a time varying from one to several hours. The nature of the uterine colic that often supervenes should be explained to her. A sanguineous or sero-purulent discharge may follow. This is treated by vaginal antiseptic douching.

Galvano-puncture.—This involves all the same precautions as are taken in the galvano-caustic application. In the case of vaginal fluctuating tumours, complete asepsis of the vagina must be first secured. Rest in bed is essential after each puncture. The trocar should be the smallest possible, and should not pierce further than from one half to one centimètre. The rectum and bladder must be carefully avoided, any arterial pulsation being looked for by the finger, and the insulated trocar guided to the point of puncture by it. No speculum is used. Without anæsthesia from twenty to fifty milliampères is sufficient as a dose. When we go above this, from a hundred to two hundred and fifty milliampères, an anæsthetic is essential. Elevation of temperature contra-indicates any electrical treatment.

In the case of galvano-puncture for fibroid tumours, the following precautions have to be taken :—

1. Absolute and regular antiseptic irrigation of the vagina, before and after each operation.

2. Use as the puncturing instrument a small steel trocar or needle, and let the punctures be shallow, not deeper than two or three centimètres.

3. Make the punctures in the most prominent part of the fibroid whenever possible in the posterior cul-de-sac.

4. Make the punctures without a speculum. Slide the trocar through the celluloid sheath which protects the vagina, after having examined and chosen by touch the point where the puncture is to be made.

5. Ascertain the seat of any pulsation, so as to avoid wounding an important vessel.

6. In case of any unusual hæmorrhage, *immediately dilate the vagina* with an expanding speculum, and if necessary put a pressure forceps on the bleeding-point.

With regard to the poles to be used, the positive pole is the express remedy for the hæmorrhagic cases, the negative for the non-hæmorrhagic. Apostoli recommends the positive pole in endometritis, ulceration, membranous dysmenorrhœa, and hæmorrhage; the negative pole in non-hæmorrhagic cases of fibroid tumour, in the chronic stages of subacute perimetritis after the positive pole has been used, in the non-hæmorrhagic forms of chronic metritis and endometritis, in galvano-punctures, and in pyo-salpinx, combined with strict antiseptic precautions; also for galvano-puncture of fibroid tumours, and in draining fluctuating vaginal tumours.

Apostoli emphasizes the point that the actions here referred to are not electrolitic, and Buckmaster * and Hayes † point out the same fact, and that there is a chemical change at the poles influencing the various tissues of the tumour, Hayes contending that oxygen and acids are liberated about the positive pole, double the amount of destruction of tissue occurring at the negative one. He considers that there are three factors present—one physical, due to the liberation of gases; the second chemical, due to the separation of the salts of the body into the acids at one pole and the alkalies at the other; and thirdly, a physiological effect, the exact nature of which is not understood.

Inglis Parsons, who devoted considerable attention to the electrical methods, considers that electrolysis takes place at both poles, and is most destructive at the positive; that it does not occur in the intervening space traversed by the current; that the only change in the vessels is a local hyperæmia; that there is no muscular contraction in the uterus save at the make and break of contact; while Buckmaster believes that the effect of the current on a fibroid may be attained through its action on the bloodvessels and absorbents, the muscular tissue, the nerves, the connective tissues and the cells directly.

* *Brooklyn Med. Jour.*, Nov., 1888. † *Brit. Gyn. Jour.*, 1889.

CHAPTER XLVII.

MASSAGE.

In view of the importance of treatment by massage in various affections incidental to women, I devote a few observations to it as a fitting conclusion to this work. As the name implies, massage by itself simply means (μάσσω) handling or manipulating. We have in massage, as in many other arts or seemingly new practices, an exemplification of the old adage, that 'there is nothing new under the sun,' for there can be no doubt that the ancient Greeks and Romans availed themselves of this plan of treatment, and, indeed, long before them the Chinese had skilled rubbers.

It is my object, in these few observations, to give my personal experience of the use of massage in the various affections for which I have employed it, and to emphasize some matters of importance to the practitioner who does not wish to become the purest empiric or charlatan, in adopting this potent plan of treatment.

I have for many years largely availed myself of massage in gynaecological practice, in various neurotic affections, in hysteria, in irritable spinal cases, in localized neuralgias, in painful ovarian states, in amenorrhoea and dysmenorrhoea, in 'uterine lameness,' and for those nomadic sufferers who wander almost aimlessly from physician to physician, 'seeking help and finding none'—women suffering from uterus on the brain. Abdominal massage, combined with galvanism, has proved at my hands most valuable in cases of chronic costiveness, especially after dilatation of the sphincters.

Varieties of Massage.

I must here protest strongly against the arrant quackery, the rage at present, which is *called* massage, and against the itinerant humbugs who are termed masseuses or masseurs, and who are crassly ignorant of any intelligent application of massage.* As I have

* I desire to express my obligation, mainly to the classical text-book of Professor Michael Foster, in compiling the summary of the physiological results of the various experimental researches which bear on the effects of massage or

already said, this is not a special work entering into a detailed description of the different forms of massage known as 'éffleurage,' 'pétrissage,' 'friction,' or 'tapotement,' according to the direction and nature of the movements, whether light and more superficial, or deeper and stronger, or effected by percussion and digital pressure. Each variety of massage has its physiological effect on the muscles which are masséd, whether rubbed, kneaded, pinched, or flagellated.

By *éffleurage* is meant a peculiar stroking movement made with the palm of the hand, centripetally, in the course of the veins and lymphatics, and in the direction of the muscular fibres.

By *pétrissage* is meant the deeper kneading of the muscles by a movement of combined rolling and pressing, the muscle being seized and squeezed, the movement being made in a centripetal direction.

By *friction* we understand a combined movement of the finger-ends of both hands, one being carried *across* the axis of the limb by repeated strokes, and the other *in* the axis of the limb.

By *tapotement* we imply the percussion of the muscle or limb with the finger-tips, or percussor, or with the back of the half-closed hand. Most masseuses rub with oil, vaseline, or lanolin. This is advisable in some cases, though for my own part I prefer 'dry' massage, and I find patients like it better as a rule. With it, as Murrell points out, you have more muscular contraction, and the electrical currents are more readily developed in the tissues.

Physiological and Clinical Effects.

I must group these various methods of action under the general term massage, and even include with these manipulations certain flexions and extensions or movements that are of necessity often combined with them in practising massage. Yet the physiological fact must be remembered that the nature of the stimulus, *i.e.* its character and mode of application, applied to a muscle, influences not alone the kinetic energy of the muscle, but also the force and distribution of the reflex impulses; we do not get the same results with stroking as we do with either vibration movements or *tapotement*. With deep kneading we have a different result from that obtained by both of the former acts.

I may summarize, albeit very imperfectly, the more important physiological effects of massage on muscle, nerve, vascular distribution and lymphatic supply.

Muscles.

The chemical and physical changes consequent upon stimulation of muscles and muscle action, which modern physiological research has established:

gymnastic exercises. Also I have had, amongst other sources, special assistance from the excellent manual of Dr. Joseph Schreiber, of Vienna, translated by Dr. Walter Mendelson, of New York (Young Pentland, Edinburgh). Another admirable manual in the English language is the 'Practical Treatise,' by Dr. Douglas Graham, of Boston (Wood and Co., New York).

(*a*) Generation and discharge of carbonic acid.
(*b*) Absorption of oxygen.
(*c*) Creation of lactic acid and other chemical changes in the muscle.
(*d*) Probable slight increase in muscle temperature.
(*e*) Slight alteration in bulk of the muscle, attended by changes in the blood-supply, both in quantity and character.
(*f*) Generation of reflex impulses. With regard to this effect, it has to be remembered, as Foster remarks, that 'a muscle, even putting aside the visible terminations of the nerve, is fundamentally a muscle and a nerve besides.'
(*g*) Readier response to electrical stimuli after massage, and probable electrical changes; during massage, excitation in the muscle-nerves excited.
(*h*) An influence on unstriated muscular peristalsis.

Nerves.

Chemico-physical molecular changes in the nerve-tissue starting both sensory and motor impulses; these centripetal impulses affect the central ganglia, and influence both automatic and reflex actions. The phenomenon of inhibition is manifested. Analgesia is produced by prolonged and continued pressure.

The Vascular Mechanism.

The main effects are to be seen in the peripheral arterial resistance. The peripheral resistance is generally lessened (at times may be temporarily increased) by massage. This is principally due to the following effects: Altered nutrition of parts; change in the peripheral vaso-motor control: reflex stimulation of the vaso-motor centres; altered blood-pressure due to the presence of carbonic acid and loss of oxygen (according to Sommerbrot,* intra-bronchial pressure taking an important part in this action on the heart.) These effects are manifested in altered blood-pressure and arterial tension, primary diminution, secondary increase.

The heart's beat may be influenced by (*a*) the local reflex effects on the skin and muscle, or through the abdominal nerves, during abdominal massage, from splanchnic inhibitory action; (*b*) by the alteration in the arterial pressure, either local or general, brought about by the massage. Such vascular changes are necessarily attended by a local determination of blood, by alteration in the velocity of the blood current, in the metabolic tissue changes, in the nutrition of the parts manipulated, in the comparative rapidity of the removal of excrementitious material. More especially important are such physiological effects if manifested in the case of the portal and renal circulations.

Lymphatics.

In deep massage of the extremities, or kneading, the centripetal flow of lymph in the tendon and fascia lymph vascular spaces is expedited. This

* Sommerbrot: 'Ueber eine bisher nicht gekannte wichtige Einrichtung des menschlichen Organismus.' Tübingen, 1884.

will be the case also in the tendinous and fascial structures composing a great part of the abdominal wall: the processes of absorption and resorption are promoted; lymphatic glandular activity is excited. The same occurs in the more superficial lymph vessels from stroking the skin and vibration movements. During deep abdominal massage a powerful influence must be exerted on the lymphatic vascular mechanism and on the nature of the fluid in the lacteal vessels. This will result directly from the continued or intermittent mechanical pressure exerted through the abdominal wall, independently of the altered relations between the superficial and deep lymph currents and the bloodvessels. It must also follow from the effects of massage on the portal circulation. I allude to the more rapid reception by the portal blood of the products of digestion which find their way into it. This temporary increased diversion of food elements necessarily influences the chyle and the tension of the lacteal vessels. Also in general massage, followed by abdominal, through the continued suction effects of increased respiratory movements and general (primary) diminished venous pressure, the lymphatic flow is temporarily encouraged, while through the nervous influence on the abdominal vascular system generally, lymphatic absorption is promoted.

These physiological facts, necessarily modified by the local anatomical relationships, can be well applied to the pelvic structures in which gynæcologists are more especially interested.

We may correlate such physiological effects of massage with the more manifest clinical phenomena and effects noticed in its practice.

(1) Slight immediate changes in body temperature. These are not constant, and vary, with rare exceptions, to the extent of a degree more or less; of this I have satisfied myself several times. There is occasionally a fall; this is not so common as a slight rise.

(2) Decided increase, as a rule, in muscle nutrition and power of endurance; increase of muscle weight.

(3) Restoration of reflex excitability in weakened muscles, and the improved association of reflex and automatic action.

(4) Reduction of cutaneous and muscular hyperæsthesia, and relief of pain arising from reflected irritations in distant regions.

(5) Increased effects of galvanism when used after massage, necessitating reduction in the strength of the current, and increased care in its employment.

(6) Improved peristaltic action, as shown in the case of the non-striated abdominal muscles of the intestines and the œsophageal muscles.

(7) Results of improved nutritive nerve changes, as we find in the case of muscle. These are shown in restored nerve function, in healthier brain action, in the production of sleep, in alleviation of perverted and distorted mental symptoms.

(8) The improvement in the tone and character of the pulse under massage treatment. This good influence on a sluggish circulation is exhibited in the effect on cold extremities; the same result is seen in cases of rhythmic irregularity of heart, due to torpid hepatic circulation, flatus, and abdominal obesity.

The occasional attack of syncope, which I have seen in a few instances, is the effect of either a reflex inhibitory stoppage of the heart's beat, or faintness arising from rapidly lowered arterial pressure. In one patient, vascular and nervous excitement were so pronounced every time head massage was tried that I had to abandon it. This was shown in suffusion of the face and eyes, sense of weight in the head, great mental excitement, hysterical crying; these symptoms were followed by corresponding mental depression.

(9) Absorption of fat* and loss of weight due to removal of excrementitious material and useless fat, with improved digestive powers. Such therapeutic use of massage must be continued, with the enforcement of dietetic rules and avoidance of fat-forming food.

[By an examination of the urine passed before and after the massage, we can see the effects on the ingredients of the secretion.]

(10) Reabsorption of lymph effusions and various exudations; reduction of glandular hyperplasias.

While thus enumerating the physiological and clinical effects of massage, as experienced under favourable conditions of temperament and physique, and aided frequently by other therapeutical means—such as galvanism or faradism, baths, medicinal agents, special dietary—it must be stated that the process is frequently attended by various exaggerated or unexpected results in some or all of the directions enumerated which completely contra-indicate its employment. *It is not a course to be prescribed or recommended in a careless or cursory manner.*

Once for all, let me say that the massage I am speaking of is *not 'vicarious exercise.'* Massage in some of its methods is a form of exercise, but exercise is not massage. *Manual massage differs widely from exercise*, gymnastic or other, in (*a*) the nature of the excitation; (*b*) the power of its limitation to defined areas; (*c*) the direct action on the bloodvessels, lymphatics and nerves; (*d*) the comparatively slight evolution of body heat; (*e*) the passive attitude of the subject; (*f*) the absence of the more complex actions of a reflex and automatic nature, with the associated cerebral inhibitory

* W. S. McKee (*New England Medical Monthly*, November, 1891), commenting upon the frequent association of obesity and menstrual disorders, makes the following generalizations:

Obese women usually have scanty menstruation, the periods being irregular and usually accompanied by sacral pains; they are very liable to abort, or if they go to term, to produce offspring deficient in vitality; they are very frequently sterile, and in such the sterility has been cured by abdominal massage, purgation, and a strict dietary.

supervision, which are the necessary attendants on exercise. The more complicated, or the more finely adjusted, such exercises, the more widely do they depart in their nature from the manipulation of massage. We might as well compare the necessary manipulations and the physical labour or fatigue of the masseuse with the effects on the person rubbed.

Use in Gynæcology.

(1) Atonic conditions generally, both of muscles and nerves, as, for instance, relaxed abdominal walls; intestinal flatulent distension; chronic tympanitic states; chronic constipation; those forms of general debility and lassitude complicating menorrhagia, subinvolution, and other chronic uterine affections.

(2) In reflex neuroses arising from or complicating morbid states of the generative organs in women; so-called cases of irritable spine: reflex headache; cases of 'uterine lameness'; neuro-mimesis of joints, torticollis.

(3) In amenorrhœa and dysmenorrhœa, especially those cases associated with anæmia and chloræmia.

(4) In neuralgias of the pelvic nerves—oophoria, neurasthenic coccygodynia.

(5) In unhealthy fat accumulation.

(6) In masturbators.

(7) In that numerous class of female patients in whom there is no organic disease, and who are generally grouped as the victims of hysteria, neurasthenia, or hypochondria.

(8) Glandular hyperplasia.

(9) Mammary infiltrations, in chronic mammary hardening, in threatened milk coagulation, in mammary neuralgia.

Here I may casually refer in passing to the good results I have seen in chronic constipation from abdominal massage. I allude particularly to cases of fæcal accumulation. I believe the proper treatment for the more obstinate of such cases to be dilatation of the sphincters and emptying of the rectum, followed by galvanism and deep massage of the abdomen. A course of belladonna and nux vomica should accompany the massage.

Massage for Constipation.

When massage is practised for constipation, the woman should get into the knee-elbow position—the masseuse kneels behind and massages the colon in its course from the cœcum to the sigmoid. This is done by pétrissage and vibratory movements. The entire

abdomen is next manipulated. Lastly, the sponge of the constant-current battery is carried over the entire course of the colon.

Combined Internal and External Massage.

I have here purposely included only those affections in which I have had ample personal proofs of the benefit of massage. I do not in any remarks I make refer to combined internal and external massage, of which there are as many kinds as there are methods of gynæcological examination. It is needless to insist on the care which is necessary in carrying out such a plan of treatment. How far a licensed abuse of this practice might be carried we need not discuss. How far the possible advantages may be overbalanced by the certain evils it is not difficult to surmise.*

I know nothing, personally, of the value of this latter form of massage in metritis, ovarian tumour, perimetritis, cystitis and uterine tumours, and not having tried its efficacy, I do not wish to express any opinion on the results of this treatment in the hands of those who have.

Massage in Descent and Prolapse of the Uterus.

Massage and pelvic gymnastics have been practised by Brandt of Stockholm, Schauta, and others. It consists, briefly, of (1) elevation of the uterus by a plan of combined internal and external manipulation, followed by (2) massage of the uterus and its ligaments, principally by *external* movements in the direction of the internal os from the fundus, the uterus being supported against the abdominal wall by the assistant's finger in the vagina. These uterine movements, etc., are followed by (3) pelvic gymnastics, the patient's thighs, as she lies in the lithotomy position, being forcibly abducted, while she resists, at the same time that she raises the sacrum from the couch, and supports herself on the elbows and feet. Lastly (4) tapotement of the lumbar and sacral vertebræ is practised with the clenched fist. In the six cases in which this treatment was tried, the permanent successful results are only recorded in two; on the whole the writer speaks favourably of it. Alfred Smith devised a uterine elevator which the patient can herself use to raise the uterus, and thus avoid the necessity for an assistant's fingers in the vagina. Smith, 'Transactions of the Academy of Medicine in Ireland, 1889.'

Dangers of Massage.—It would seem superfluous to speak of the dangers attending the use of massage in perimetritis, and the risks of an uncertainty of diagnosis in these affections, both as to the situation and character of effusions, but in works on massage its employment is advised by various authorities in these conditions. One thing appears certain, that the responsibility of administering it in acute pelvic cellular or peritoneal inflammations should rest

* That the truth of this statement should be brought so prominently before the profession and the public as it has been of late I did not contemplate when I wrote this in 1889.

with no one save a qualified medical manipulator. Even in cases of chronic lymph or serous exudations in the pelvis, I maintain that no nurse should be entrusted with the administration of massage, and no one should advise it save a physician, and one well versed in such diseases.

I have known patients who were 'rubbed' for fibroid tumour and ovarian cyst. The kinetic energy here might have been more safely expended on the lady's boots. Not long since I had a patient with contracted vulvar orifice, lupoid degeneration of the vaginal wall, and uterine hæmorrhage. She consulted me for the hæmorrhage. This was stopped. The next I learned was that she was being 'rubbed.' A lady friend recommended it, and a doctor sent the masseuse. She was being 'cured.' The last thing I heard of her was that she was dangerously ill, and under the care of the doctor who sent the masseuse. I have reason to believe that at the time he never locally examined the case. She has since died. *This* is an example of the vulgar abuse of massage.

CONCLUSIONS.

I maintain that it is the duty of the physician to superintend the administration of the massage, so far as constantly seeing its effects on his patients, and directing the kind of massage to be used, and the length of time it is to be practised. Also he should regulate the diet, hours of rest, quantity of exercise, amount and character of amusement, times of bathing, and see that the intellectual side of his patient's nature is not wholly neglected for her physical. Massage by no means agrees with all for whom we may feel disposed to recommend it.

I would advise all medical men, in determining to make use of massage—

1. To study for themselves the various kinds of massage, and the physiological effects of each form.
2. To select, after careful personal inquiry and questioning, their own masseuse, who must be an intelligent, cheerful woman, with exceptional tact and decision of character.
3. To see that she has some elementary knowledge of anatomy and physiology, and the position of the muscles and bones.
4. To regulate and superintend the kind and the times of massage; the intervals of rest, exercise, and the dietary.
5. If pursuing the Weir-Mitchell plan of rest, feeding, and seclusion, to watch its effects on the patient, and not to blindly adopt this method of treatment without careful supervision, trusting neither to nurse nor interested home proprietress to carry it out.

Also to endeavour to have a modified system of massage (so far as

is possible) persevered in for some time after the patient is removed home.

6. To begin in most cases with general massage of the extremities, trunk, and back-muscles, gradually practising abdominal massage. This rule, of course, does not apply to those cases in which abdominal massage is especially indicated.
7. Not to use massage immediately before or after meals. Some light nourishment may be taken previous to the rubbing. The patient should generally rest for an hour, and, if she sleep, should not be disturbed. When she wakes she may be given a seaweed bath, and be well rubbed down. Then she should have her drive or light exercise.
8. The best time for massage is in the morning. I prefer the hour of eleven a.m. The duration of the séance will depend on the nature of the case. I find half an hour's éffleurage generally ample. Two or three short séances in the day are better than one prolonged massage.
9. The practitioner will find that much of the success of his treatment will depend on the type of woman he selects for his cases. She requires strength of body as well as of will, while with these there must be combined gentleness and patience. She must be a woman calculated to inspire hope and confidence, and, above all, reticent in speaking of other patients or their ailments.

Vibration Treatment of Fibromata and Adnexal Affections.

Jayle and De la Croix de Lavalette * have published a complete communication on the treatment of uterine and adnexal affections by mechanical vibrations (*Sismothérapie mechanique*), contrasting this treatment with massage and its relative utility. The results of the two methods are somewhat analogous, but the sismothérapic treatment has the advantage of being very simple– any one can practise it; and there is no necessity for vaginal manipulations.

They report that the immediate results are good, and that an amelioration of the symptoms is rapidly obtained. They claim for it that it is a palliative therapeutic method which can be employed in all cases in which no suppurative conditions of the adnexa are present, or other suppurative states of the pelvis. Cases are reported in which fibromas have been successfully treated so far as the reduction of the size of the tumour and the arrest of hæmorrhage are concerned. Relief of congestion of the pelvic basin, and improvement of the intestinal circulation, are brought about.

Appliances.—There are various vibrators. A large one for interchangeable excitations; a small hand machine in which there is, a

* *Revue de Gynécologie*, Pozzi, July-August, 1899.

dynamo mounted on a socket and fixed to a handle (Fig. 631). Different excitors may be attached to this hand apparatus. It is recharged with an ordinary communicator. The third is the machine shown in the text. It is composed of a small electrical motor which acts directly with an alternative current of 110 volts, giving a force of 15 kilogrammetres with a rapidity of 1800 to 2000 revolutions to the minute. This is stood on a small table alongside the bed, and on this is placed a short circuit apparatus, an interruptor and rheostat enabling the operator to regulate the rapidity of the motor. The table is so connected with the current from the main by a flexible cable as to enable it to be attached to the socket of any

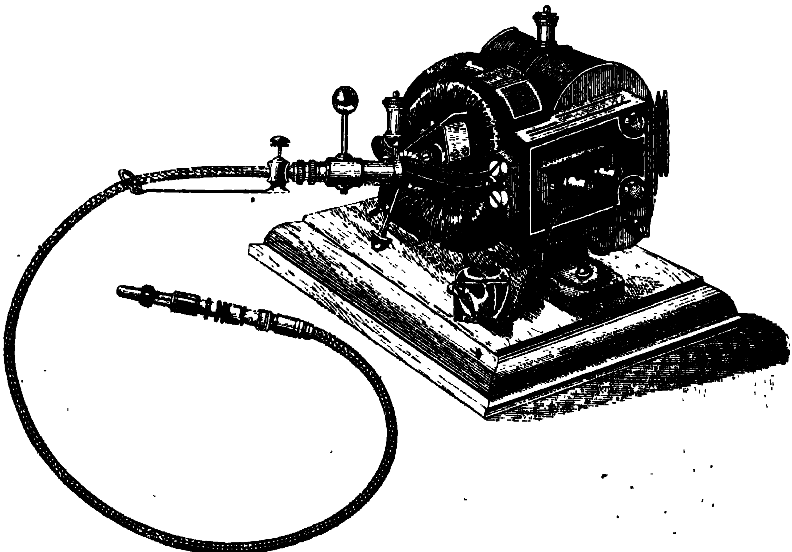


FIG. 630.—ELECTRICAL MOTOR AND CABLE WITH STEM.

incandescent lamp. The rotatory movement is transmitted to a *concuteur*, which is directly attached to the cylinder of the motor. The vibratory motion is thus transmitted through the small pads attached to the plaque, which is fixed to a stem that is connected with the flexible cable by a form of bayonet catch. and thus the plaque has conveyed to it the necessary vibratory movement. The plaque is now applied to the part it is desired to massage, and the movement is communicated to it. The sitting lasts from ten to twenty minutes. The morning hour after the breakfast meal is the preferable time, and the patient's bowel and bladder should be

emptied before the massage is commenced. After each sitting the patient should rest for a quarter of an hour on the back or in the prone position. There need be no interruption of the patient's occupation, though it is not well that she should overdo exercise while the treatment is being carried out During the application the woman should lie on her back, and the vibratory plate is simply applied to the abdominal wall on a level, say, with the fibroma, if it should be used for a tumour; or one or two fingers of the left hand are introduced into the vagina, and counter pressure is made from within in the direction of the part to which the application is being made. No pressure, however, should be such as to prevent the vibrations from traversing the abdominal wall or the pelvic organs. The treatment may have to be continued from some six weeks to three months. More patience is demanded for the completion of the cure than

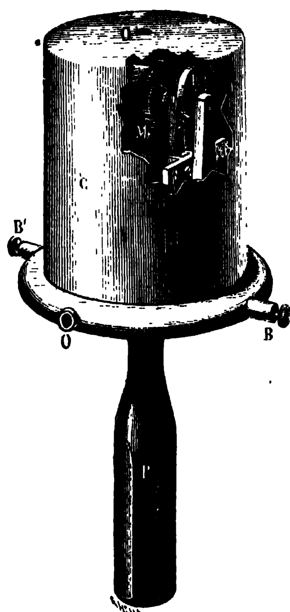


Fig. 631.—Electrical Hand Vibrator.

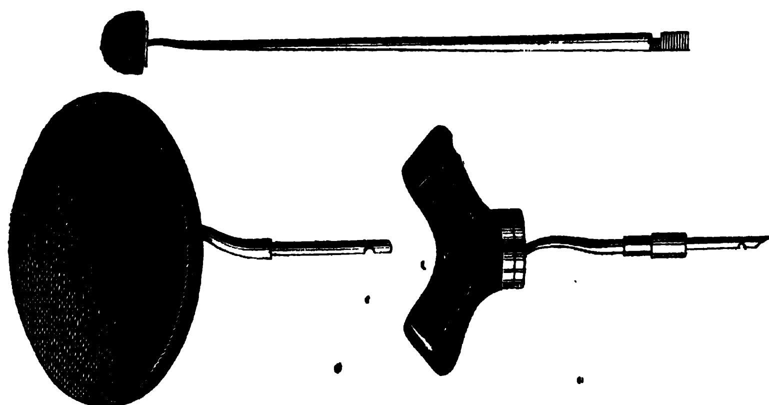


Fig. 632.—A Few Concutelrs.

we are likely to secure generally from the majority of patients.

The indications for the treatment are fibromas with hæmorrhage, inter-menstrual fluxes, erratic pelvic pains, general nerve states, chronic salpingo-oöphoritis of a non-suppurative character, general



FIG. 633.—APPLICATION IN THE DECLINING POSITION AND WITH A FINGER MAKING PRESSURE IN THE VAGINA.

debility, when attendant upon some disorder of the female genital organs, and gastric intestinal atony.

CHAPTER XLVIII.

A FEW OF THE PRINCIPAL FOREIGN AND HOME SPAS.

PRACTITIONERS are often consulted as to the class of spa to which a patient should be sent. This list will be found convenient for ready reference, and from it a final selection may be made.

The author by no means intends this list as a complete one.

(*The nature of the water is roughly given, and the situation.*)

PELVIC AFFECTIONS OF WOMEN.

NAME.	CHARACTER OF WATER.	SITUATION.
Adelheidsquelle ...	Salts, with iodine and bromide	Bavaria.
Barèges	Sulphurous	Hautes-Pyrénées.
Bagnères de Bigorre	Ferruginous; arsenical ...	" "
Bourboule, La ...	Highly arsenical	Puy-de-Dôme.
*Brides-les-Bains ...	Alkaline	Savoy.
*Carlsbad	"	Bohemia.
Carlsbrunn ...	Ferruginous (effervescing) ...	Silesia.
Eaux-Chaudes ...	Sulphurets with chlorides ...	Basses-Pyrénées.
Ems	Alkaline	Duchy of Nassau
Les Escaldas ...	Sulphurous, etc.	Pyrénées Orientales.
*Franzensbad ...	Ferruginous; alkaline ...	Bohemia
*Wilbad-Gastein ...	Electrical	Duchy of Salzburg.
*Kissingen ...	Saline (chlorides)	Bavaria.
*Kreuznach † ...	Saline; strongly iodized; mud baths...	Rhenish Prussia.
*Marienbad ..	Ferruginous and alkaline ...	Austro-Hungary.
Nenndorf	Sulphates and saline	North-west Germany.
*Plombières ...	Various; ferruginous	Vosges.
Pyrmont	Ferruginous; brine baths, etc.	Waldeck-Pyrmont.
*Royat	Arsenical and iron	Puy-de-Dôme, France
Salins-Moutiers ...	Various; ferruginous, chlorides, and iodides	Savoy.
*Schwalbach ...	Ferruginous	Hesen-Nassau.
*Spa	"	Belgium.
Uriage	Saline; sulphurous	Isère, France.
*Woodhall	Bromine and iodine	Lincolnshire

* Those Spas marked with an asterisk are ones which the author can most strongly recommend in affections of the pelvic organs of women.

† I believe that the Woodhall Spa water is in every respect equal to Kreuznach, and is a more powerful bromated spa. Also the climate is not so enervating

SPAS (*continued*).

ANÆMIC STATES

NAME.	CHARACTER OF WATER.	SITUATION.
Bagnères de Bigorre	Ferruginous and arsenical	Hautes-Pyrénées.
Bath	Ferruginous	Somersetshire.
Biarritz	Sea-air (winter) ...	Basses-Pyrénées.
Cannes	Sea-air	Maritime Alps.
Carlsbrunn ...	Ferruginous	Silesia.
Châtel-Gyon ...	Chlorurets of sodium and magnesium, and ferruginous ..	Puy-de-Dôme.
Felixstowe ...	Ferruginous	Suffolk.
Franzensbad ...	Alkaline; ferruginous ..	Bohemia.
Levico	Ferruginous and arsenical ..	Trentino, Austria.
Marienbad	Ferruginous and saline ..	Austro-Hungary.
Plombières ...	Various; ferruginous ..	Vosges
Pyrmont	Ferruginous	Waldeck.
Rippoldsau ..	Saline; chalybeate	Black Forest.
Royat	Arsenical and iron ...	Puy-de-Dôme, Franc (1,180 feet).
Schwalbach ...	Ferruginous	Nassau.
Spa	,,	Belgium.
Stahlbrunnen of Homburg ...	,,	Central Germany.
St. Malo	Sea-air	Ile-et-Vilaine, France
St. Raphael ...	,, ...	Var, France.
Tunbridge Wells ...	Ferruginous	Kent.
Vals	-	Ardèche, France.

GLANDULAR ORGANS (STRUMOUS AFFECTIONS)

Ashby-de-la-Zouch	Saline ...	Leicestershire.
Eaux-Bonnes ...	Alkaline sulphates	Basses-Pyrenées.
Eaux-Chaudes ...	Sulphurets; chloride	
Ischl	Sulphurous ..	Austria.
Kreuznach[1] ...	Bromine and iodine	Rhenish Prussia.
Leamington ...	Chlorides ...	Warwickshire.
Leuk	Sulphates, etc.	Switzerland.
Lichtenthal ...	Ferruginous ...	Baden.
Marienbad	Alkaline ...	Austro-Hungary.
Reichenhall ...	Saline	Upper Bavaria.
Sankt Moritz ...	Alkaline ...	Switzerland.
Tarasp	,, ...	,,
Weston-super-Mare	Sea-air	Somersetshire.
Woodhall Spa ...	Bromine and iodi[ne]	Lincolnshire.

as that of the German resort. I have sent a large number of patients to Woodhall, and can testify most emphatically to the benefit the majority have derived from the course there. Dr Williams, the energetic local medical adviser of the Spa, gives me the same general report of the value of the treatment in uterine and pelvic affections of women. My experience ranges over several years. In the early stages of fibroma, in perimetric effusions, and in subinvolution, I have found in the majority of cases a decided improvement, and permanent arrest in several

SPAS (*continued*).

DEFECTIVE BILIARY METABOLISM AND GOUT.

	CHARACTER OF WATER.	SITUATION.
Aix-les-Bains ..	Sulphurous	Savoy.
Aix-la-Chapelle ..	Alkaline and sulphates ...	Rhenish Prussia.
Baden-Baden ..	Alkaline; chloride of sodium	Duchy of Baden, Germany.
Bath	Alkaline and sulphates ...	Somersetshire.
Bilin	Alkaline (carbonates) ..	Bohemia.
Bourboule, La ..	Arsenical, etc....	Puy-de-Dôme, France.
Brides-les-Bains ..	Alkaline	Savoy.
Buxton	Various spas	Derbyshire.
Carlsbad	Alkaline; soda salts	Bohemia.
Cheltenham ..	Various spas	Gloucestershire.
Contrexéville ..	Alkaline	Vosges.
Ems	"	Germany.
Harrogate	Sulphur; iron; saline ...	Yorkshire.
Homburg	Alkaline, with iron and sulphur	Central Germany.
Kissingen	Saline (chlorides)	Bavaria.
Leamington ..	Alkaline	Warwickshire.
Lisdoonvarna ...	Sulphur, etc.	Co. Clare, Ireland.
Llandrindod Wells		Brecknocksh., Wales.
Malvern	Brine and saline baths ...	Worcestershire.
Marienbad... ...	Saline (with iron)	Bohemia.
Nauheim	Saline (chloride of sodium) ...	Hessen-Nassau.
Pougues ...	Alkaline and ferruginous ...	Nièvre, France.
Strathpeffer ...	Sulphur and sulphates, etc. ...	Ross-shire.
Vals	Alkaline and alkaline earth (bicarbonates); various spas	Ardèche, France.
Vichy	Alkaline and alkaline earth (bicarbonates); various spas	Central France.
Vittel	Various salts (sulphates and bicarbonates of lime and magnesia; iron, and manganese)	Vosges.
Wiesbaden	Saline (chlorides)	Nassau.
Wilbad	Electrical baths	Black Fore

AFFECTIONS OF THE URINARY ORGANS.

Baden-Baden ...	Chloride of sodium (arsenic and lithium)	Duchy of Baden.
Bilin	Saline	Bohemia
Buxton	Various; carbonate of lime; iron	Derbyshire.
Carlottenbrunnen ...	Chalybeate	Silesia (whey cure).
Carlsbad	Alkaline: soda salts	Bohemia.
Contrexéville ...	Alkaline	Vosges, France.
Ems	"	Nassau.
Harrogate .. .	Various sulphur spas; also iron and saline	Yorkshire.

SPAS (*continued*).

Affections of the Urinary Organs (*continued*).

	Character of Water.	Situation.
Homburg ..	Alkaline, with iron and sulphur	Central Germany.
Kissingen .	Saline (chlorides)	Bavaria.
Mannheim ..	Saline	Central Germany.
Marienbad ..	Alkaline and ferruginous ...	Bohemia.
Montecatini	Saline, various	Lucca, Italy.
Neuenahr ..	Alkaline	Rhenish Prussia.
Vals ..	Alkaline and alkaline earth (bi-carbonates); various spas ...	Ardèche, France.
Vichy ...	Alkaline and alkaline earth (bi-carbonates); various spas ...	Allier, France.
Vittel ..	Various salts (Grande Source) .	Vosges, France.
Wildungen	Alkaline	Waldeck.

Affections of the Nervous System.

Corfu	Sea-coast	Ionian Islands.
Ems ...	Alkaline; muriatic	Duchy of Nassau.
Wilbad-Gastein	Electrical	Duchy of Salzburg
Levico ...	Ferruginous; arsenical ...	Trentino, Austria.
Marienbad ...	Ferruginous; alkaline ...	Austro-Hungary.
Nauheim ...	Saline and ferruginous ...	Hessen-Nassau.
Plombières	Various; gas baths	Vosges.
Rippoldsau	Saline effervescent; chalybeate	Black Forest.
Ragatz ...	... ...	France.
Salins ...	Various	Savoy.
St. Sauveur	... ...	France.
Teplitz-Schönau	Alkaline and saline	Austria.

APPENDIX.

POST-OPERATIVE INSANITY.*

CHRISTOPHER MARTIN operated upon a patient, aged 42, in the Warwick Asylum for ovarian tumours, who suffered from melancholia, from which she passed into dementia. The case ended in complete recovery. He refers to two other instances of menstrual mania which were cured by pan-hysterectomy. In the one case four years, in the other two, have elapsed since the operation, and both have completely recovered. On the other hand he operated upon two cases, one of vaginal hysterectomy for chronic metritis and hæmorrhagic endometritis, and the other a case of pan-hysterectomy for myoma, in both of which insanity followed the operation, one about a week and the other three weeks later.

Japp Sinclair has published the particulars of an interesting case of a lady who had been confined in the Cheadle Royal Asylum. She suffered from a bleeding fibromyoma, and had been subjected to a long course of expectant and old womanly treatment for the same. Sinclair performed hysterectomy, and though there was an anxious time after the operation, she never again had to return to the asylum, from which she had been temporarily removed for the purpose of operation. Ernest Hall reports another most interesting and instructive case. The patient suffered from intermittent melancholia for nearly three years, and came to be looked upon as a hopeless case in the London Asylum (Montreal). The adnexa, when examined, after she had been in the asylum from April, 1895, to January, 1898, were found diseased. Complete recovery followed on oöphorectomy.

Auguste Martin, of Berlin, in writing to me says, 'that all his experience teaches him that healthy women do not run the risk of insanity from their sexual functions, nor are they endangered as to insanity by operations on their sexual organs. Still, if their mental condition at the time of the operation, or previously, be not a normal one, operations on the sexual organs induce mental instability or temporary insanity, the more so in proportion as their physical and mental state have been impaired prior to the operation.'

* See chapter on the Correlation of Sexual Function and Insanity, pp. 678–686.

Wood, of Hoxton, out of eleven cases admitted to the Asylum within ten years, of women who suffered either from climacteric insanity, or in whom sexual disturbance was attributed as a cause, shows that in one case melancholia had followed removal of the ovaries, in another it supervened after suppressed menstruation, and in another, a senile case, prolapsus uteri was present. There was one case of mania of pregnancy, one of the mania of puberty, and six of climacteric insanity.

The late George Keith had six cases of insanity out of sixty-four hysterectomies, and Savage, of Birmingham, collected records of four cases of insanity out of 483 cases of oöphorectomy.

George Rohé says, with reference to post-operative insanity, that while there is little difference in the two sexes between the number affected, the graver forms follow, in the majority of cases, operations upon the abdominal and pelvic organs in women. Excluding cases of heredity, or acquired psychopathic predisposition, the mere removal of the ovaries would have, he thinks, no greater psychical effect than the removal of the arm or leg.

Confusional insanity is the form frequently found as post-operative, and both Rohé and Hurd, of Baltimore, who have written on post-operative insanity and undetected tendencies to mental disease, consider that the great majority of the cases are due to toxæmia from septic infection. 'There is no ground for considering,' says Hurd, 'that the operation *per se* produces mental disease,' and, so far as the removal of the ovaries is concerned, a premature climacteric insanity may be developed, but this is due to the loss of the organs, and not to operation.' The essential prerequisite for the development of post-operative insanity must be in all cases a neurotic organization, predisposed, either from hereditary taint or from acquired nervous weakness, to take on diseased action in consequence of any disturbing influences. Operation should be discouraged in people of this constitution.'

Congenital Malformations of the Sexual Organs.

At p. 783 I have recorded the particulars of a case in which there was a small rudimentary uterus and where the adnexa were absent. Thanks to Dr. Dolan, of Halifax, I have since seen a patient, aged 22, who had never menstruated. She had been treated for amenorrhœa, and had used various remedies to induce the appearance of the catamenia. There was but little hair on the external genitals, which were normal, as were also the vaginal orifice and the vagina. The only evidence of uterus that could be detected was a small knob-like substance in the roof of the vagina, about the size of a small marble. Most careful examination, under deep anæsthesia, failed to detect any vestige of tube or ovary at either side. The mammary glands were like those of a male, and quite rudimentary. It had been noticed that as a girl she had never shown any appreciation, but rather the contrary, of advances made to her by the opposite sex.

Use of Ovarine in Sexual Insanity.—As stated in the text, the ovarian secretion has been used largely for the various symptoms arising after removal of the ovaries, and has also been employed in many cases of dysmenorrhœa, amenorrhœa, and anæmia arising out of affections of the ovaries. Mainzer at Berlin, Chrobak at Vienna, Muret at Lausanne, Jayle in Paris, were amongst the first who employed the ovarian secretion in these functional disorders of menstruation, both in the induced and prematurely occurring climacteric, and various cases have been reported of benefit consequent upon its administration in such affections. No evil results have followed from its use. The method of administration recommended is the ovarine powder, after desiccation, either in cachet. tablet, pills, or, preferably, as palatinoids.*

As to the congenital absence of the vagina, the proposition of Mackenrodt's has not been mentioned,—of implanting the vaginal mucous membrane from a case of prolapse into an artificial vagina made by dissection. In an interesting case described by Cooke Hirst, of Philadelphia, this operation was performed, the particulars of which, as it exemplifies Mackenrodt's procedure, I give here in full.

'It was possible to push the forefinger between the rectum and bladder for a distance of more than an inch, by depressing the skin at the seat of what should have been the vaginal entrance. By a combined examination with a finger in the rectum and pressure upon the abdominal walls, a body resembling the uterus could be felt in the pelvis, and to the right of it was apparently an ovary.

'There had, of course, been no menstruation and no vicarious discharge. After marriage, however, there had been menstrual molimina, with a fair degree of regularity, associated with considerable pain in the lower abdomen. Coitus after marriage had been frequent, but the woman, according to her statement, experienced no sexual excitement. In view of the menstrual molimina, the physical signs of a uterus and an ovary, and the bare possibility of establishing a communication between the uterine cavity, should there be one, and the ovary and external genitalia, it appeared justifiable to attempt the formation of a vagina.

'Being obliged at the time to perform an operation for complete prolapse, I decided to try Mackenrodt's proposition—namely, to implant the vaginal

* 1. F. MAINZER.—'Vorschlag zur Behandlung der Ausfallserscheinungen nach Castration.' *Deutsche medicinische Wochenschrift*, No. 12, 19 Mars, 1896.

2. R. MOND.—'Kurze Mittheilungen über die Behandlung der Beschwerden bei natürlicher oder durch operation veranlasster Amenorrhee mit Eierstocksconserven.' *Munchener medicinische Wochenschrift*, No. 14, 7 Avril, 1896.

3. CHROBAK.—'Ueber Einverleibung von Eierstockgewebe.' *Centralblatt. f. Gyn.*, 1896, No. 28.

4. M. MURET.—'De l'organothérapie par l'ovaire.' *Société vaudoise de médicine*, 18 Juin, 1896. in *Revue médicale de la Suisse romande*, No. 7, 20 Juillet, 1896, p. 317.

5. F. JAYLE.—'Opothérapie ovarienne contre les troubles consécutifs à la castration chez la femme.' *Presse Médicale*, No. 38, 9 Mai, 1896, p. 221.

mucous membrane from the case of prolapse into the artificial vagina, made by blunt dissection.

'Two broad and thick flaps of mucous membrane were dissected from the anterior and posterior walls of the prolapsed vagina, and were kept immersed in a warm sterile normal salt solution. The operation for prolapse was then rapidly completed. Next, in the patient with absence of the vagina, a blunt dissection was made between bladder and rectum till the rudimentary uterus was reached. The mucous-membrane flaps were sewed loosely together with catgut, side by side, over a cylindrical speculum, so that they completely surrounded it. Two catgut sutures were passed from the edges of the flap over the end of the speculum, which was then packed with iodoform gauze. The speculum, covered by the flaps, was inserted three inches into the artificial vagina; pressure being made upon the gauze packing with a forceps, the speculum was then withdrawn, leaving the packing and the flaps in place. The former was allowed to remain undisturbed for two weeks. When it was removed the mucous-membrane flaps in the deeper portion of the vagina were found to adhere and bleed when pricked. The lower portion of the flaps overlapping the skin of the vulva, which had been pushed into the vagina, later sloughed and were extruded.

'The patient had been instructed to report to her physician regularly for a dilatation of the vagina, if there should be, as there always is in such cases, a disposition to contract. She failed to do so, however, and about six months after the operation the artificial vagina had again closed. But, curiously enough, the patient and her mother declared that there had been a regular menstrual discharge after the operation, and they are both firmly convinced that the woman is now two months pregnant. She improved in health after the operation, being free from abdominal pain and putting on about twenty pounds in weight. It is the latter fact, and the deposition of fat on the omentum and abdominal walls, no doubt, that has led her to believe herself pregnant. In the operation the uterus was found to be of fair size, to possess a well-defined curve, but no uterine cavity. This case has apparently met the fate of all attempts to establish an artificial vagina with rudimentary or absent sexual organs. As a rule, such attempts are unjustifiable, but in this instance there seemed to be sufficient evidence of internal sexual organs fairly well developed to warrant the attempt.'

*Pregnancy complicated by Fibromyomata.**

William Duncan (London) has published a most interesting case (*Lancet*, March 3, 1900). The patient, aged 38, had had several previous miscarriages—the last, eighteen months prior to the operation; subsequently to which the growth had became perceptible, growing into a smooth, firm, and elastic tumour, reaching to the umbilicus. Examination under anæsthesia determined the presence of pregnancy, revealing also a soft, round, red

* See p. 419.

tumour filling the upper half of the vagina, and apparently springing from the posterior and left side of the cervix, and at these parts so closely adherent to the vaginal wall that it seemed to be growing into it. Pan-hysterectomy was performed successfully.

I am indebted to the operator for the accompanying drawing of the tumour

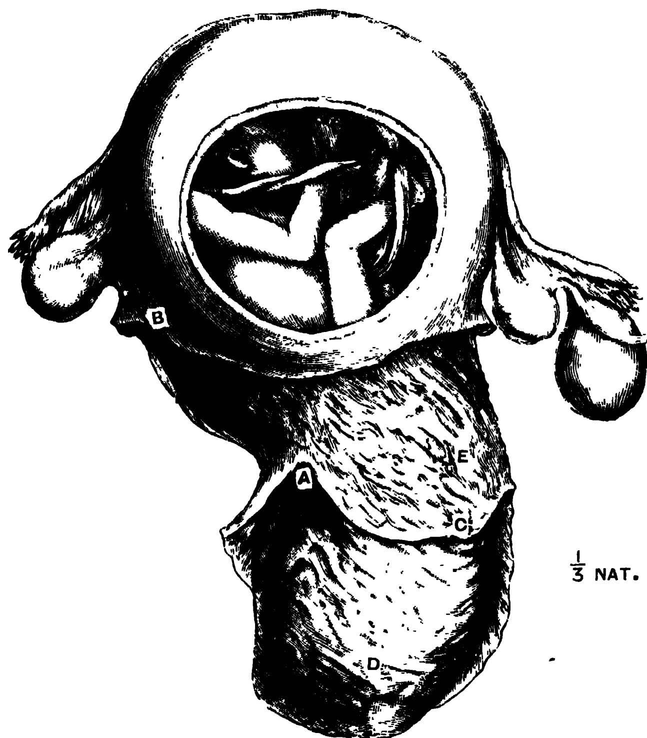


FIG. 634.—A, os uteri externum. B, cut edge of peritoneum on anterior uterine wall. C, cut edge of vaginal reflection pushed down. D, vaginal portion of tumour. E, supra-vaginal portion of tumour.

Fig. 634. To him is due the credit of having been one of the pioneers in this country in advocating the operation of hysterectomy for malignant disease of the uterus, at a time when such advocacy demanded the courage of one's convictions and independence in expressing them.

Carcinoma Psammosum Corporis Uteri.

For the accompanying drawing I am indebted to Dr. Heinrich Schmit. The woman was operated upon in October, 1898, while I was in Vienna, by

Professor Schauta. The operation was abdominal hysterectomy, and the recovery was rapid. The uterus was about twice the size of a closed fist. On the surface there were several myomata, but the uterine cavity was filled with a crumbling mass, which proved microscopically to be a *carcinoma*



Fig. 635.

psammosum of the body. In every section there were chalky concretions, consequent upon the transformation of the epithelial cells of the tumour. The primary seat of the disease was in the body of the uterus, but metastatic deposits of a similar character were found in both tubes and ovaries. Such cases are extremely rare.

INDEX.

For Instruments and Appliances, see list at end of Index.
For Index of Names referred to in the text, see List of Authorities.

LIST OF INSTRUMENTS AND APPLIANCES.

LIST OF AUTHORITIES.

THE END.

LONDON: PRINTED BY WILLIAM CLOWES AND SONS, LIMITED
STAMFORD STREET AND CHARING CROSS.